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## USEFUL RECEIPTS.

### Electro-Metallurgy Applied to the Ornamentation of Glass, China, &c.

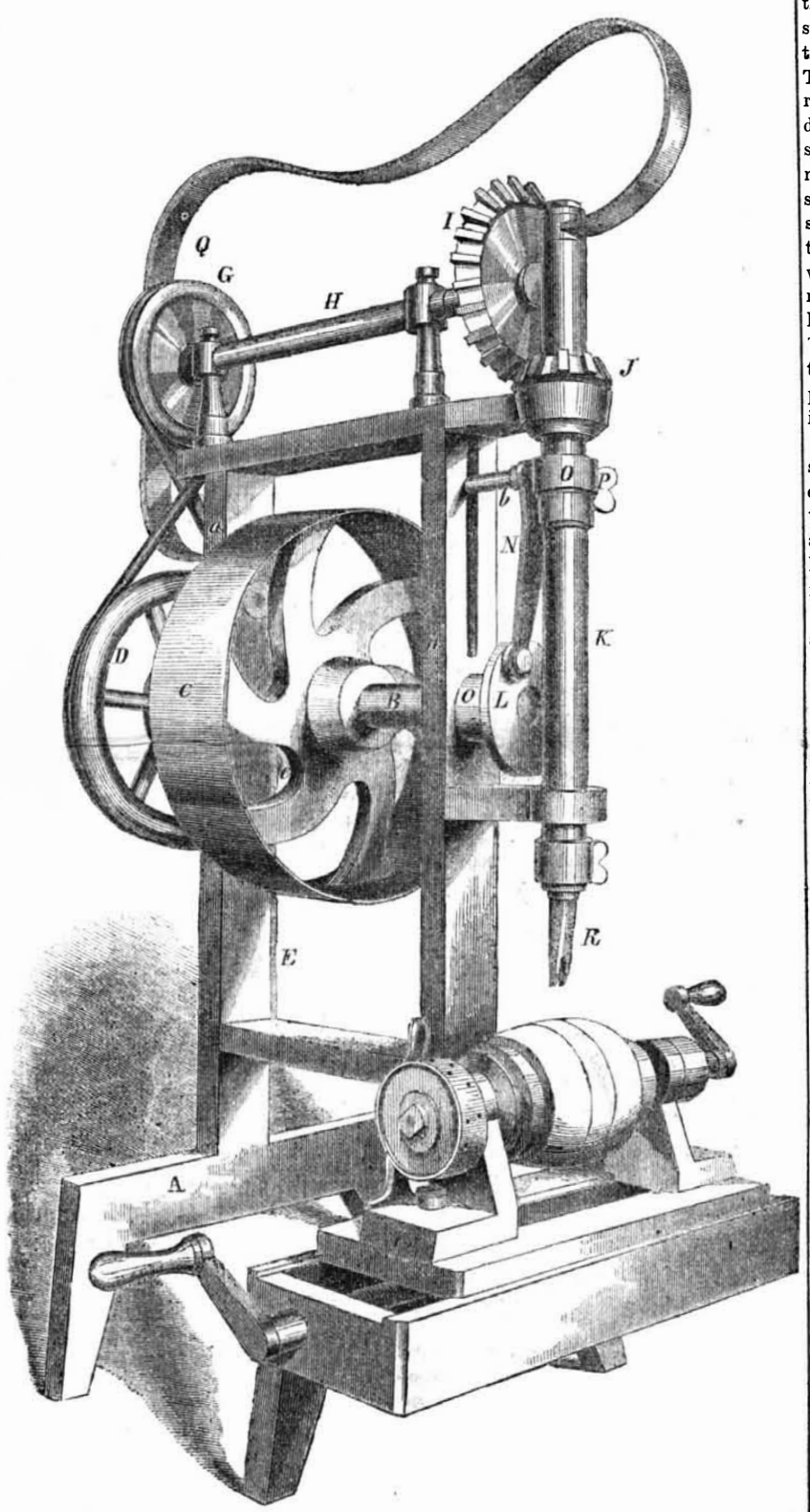
Mr. John Ridgway, of Cauldon-place, Staffordshire, England, china manufacturer, has recently patented certain improvements in the method or process of ornamenting or decorating articles of glass, china, earthenware, or other ceramic manufactures. In the specification of his patent, just enrolled, Mr. Ridgeway states that his first object is to apply a new glaze, which shall enable the metallic coating to adhere firmly, by capillary attraction, and give affinity for copper as a first coating. In pursuance of this, he first submits the article to an alcoholic solution, or a gelatinous solution. He then brushes over it an impalpable powder, composed of half carburet of iron, and half sulphate of copper. The article thus treated is then to be corroded by the fumes of hydro-fluoric acid. The article is then to be smoothed, by brushing it over with silver sand, or by the scratch-brush; but when the shape and nature of the article will not admit of this, it is to be plunged into a liquor, consisting of 6 quarts sulphuric acid, 4 quarts aquafortis, three-fourth oz. muriatic acid, and 6 quarts water. Grease is to be carefully removed from the article, and a thin film of mercury is to be applied. The solution of copper consists of 1 sulphate of copper, and 4 filtered water. Suitable solutions for silvering or gilding are to be applied, in accordance with the practice of electrotyping. The claim is not to the solutions for coating as such, but to the application of "electrotyping," or electro-metallurgy, to the objects stated in the title, provided the articles be so prepared as to allow them to combine from an alloy with them.

### How the Approach of an Earthquake may be Known.

Hitherto no means have been pointed out for indicating the approach of an earthquake, as we, by means of the barometer, derive indication of the approach of a storm. This desideratum would, however, now appear to have been supplied. M. Rati-Menton, a gentleman connected with the French diplomatic corps in the Argentine Republic, has recently communicated to the Paris Academy of Sciences, by letter, addressed to the French Minister of Foreign Affairs, a means of learning the approach of an earthquake. According to this gentleman, the earthquake indicator is nothing more than a magnet, to which is suspended by magnetic attraction a little fragment of iron. Shortly before the occurrence of an earthquake, the magnet temporarily loses its power, and hence the iron falls. According to M. Rati-Menton, the accuracy of this indicative sign has been thoroughly tested by a highly educated Argentine officer, Colonel Espinosa, during a residence of many years at Ariquipa—a region where earthquakes are very frequent.

In 1851, 584,200,500 lbs. of cotton were used in England.

## MORTISING AND BORING MACHINE.




The annexed engraving is a perspective view of an improved machine for mortising and boring the hubs of wheels, &c. The inventor is N. C. Travis, of Canistota, Madison Co., N. Y., who has taken measures to secure a patent for his improvements, which consist in giving a reciprocating motion to the mortising tool, and a rotary motion to the boring tool by the same tool stock.

A is the bottom support of the machine and *a a* the posts; a hub is placed on the table below the mortising tool, R. This hub can be moved backwards and forwards on a slide by a screw working below; B is the driving axle, and C is the driving pulley which is kept continually revolving by a band from any prime motor; O is a clutch collar, and L is a disc on it to which is secured eccentrically a reciprocating arm, N, which is attached to a guide slide pin, *b*, and connected to the boss, O. This collar is secured to the slide stock, K, by the screw, P; R is the mortising tool or chisel, it is fastened in the stock by a screw passing through the lower collar. The clutch collar, O, which carries the eccentric plate, L, is made to gear with the shaft B, by a clutch on the other side, and not seen, but which gears the collar by simply sliding it horizontally inwards. The eccentric plate, L, will then revolve, and the arm, N, will receive an up and down motion at the top, which will give the stock, K, a vertical reciprocating motion, so as to make the tool, L, cut a mortise in the hub. This is the manner of working the mortising tool. It must be observed that the pinion, I, is loose like a collar around the shank of the stock, K, but it has a feather inside which gears into a slit in the upper part of the stock, when the upper spindle, H, receives a rotary motion. When it is desired to bore in the hub with an auger, the stock, K, must receive a rotary motion. This tool, R, is then replaced by an auger or bit, and the collar O, is thrown out of gear with the shaft, B, by the clutch spoken of before. The thumb screw, P, is also unscrewed, so that the stock, K, cannot be operated by a reciprocating motion through the plate, L, and arm, N. The band wheel, D, when the mortising operation is performing, is out of gear with the driving shaft, B, so that the pinion, J, is then stationary. To give the stock, K, a rotary motion, the band wheel, D, is geared to the shaft, B, by a clutch on the other side (not shown); this band gives motion to pulley, G, the horizontal spindle, H, and bevel wheel, I, which latter drives the pinion, J, and gives rotary motion to the stock, K, thereby making the tool bore out the hole in the hub. The pinion, J, rests in the stationary boss of the top plate of the frame; Q is a spring pressing on the head of the stock, and keeping it snug and free from vibration.

Thus two motions are communicated to the stock, K, to actuate different tools and perform entirely dissimilar operations. This machine therefore combines the qualities of mortising and boring, the tool for the former operation having a reciprocating, and for the latter a rotary motion.

More information may be obtained by letter addressed to the inventor.

### Rhubarb or Pie-Plant.

P. P. Cahoon, of Kenasha, Wis., has raised a specimen of pie-plant, the leaf of one of the stalks of which measures three feet and one-inch across by three feet long, exclusive of the stem, which is thirteen inches long by seven inches in circumference. Another stem was about one and a-half feet long by six inches in circumference.

### Artesian Wells.

This subject which has attracted the attention of the citizens of Camden, N. J., for some time past, in reference to procuring a good supply of water, has become a matter of much agitation in a more prominent form. The project of constructing artesian wells at suitable distances throughout the city, is seriously entertained for the increased population of Camden has become so rapid, that a greater supply of water has become necessary.

### New Wire Suspension Bridge.

We learn by the "St. John's Chronicle," New Brunswick, that the wire suspension bridge over the St. John's river, near that city, is completed, "and every body and his wife," and all kinds of vehicles are now daily crossing over the wildest and most romantic portion of the Falls on the river by its agency. The engineer was E. W. Serrell, C. E., of this city, (N. Y.)

### The Turpentine Business.

The Fayetteville (N. C.,) Observer states that the population of that county has increased about 1,000 since the 1st of January—about 300 whites and 700 slaves, having arrived there from other parts of the State, to engage in the turpentine business.

### Coal in Massachusetts.

Prof. Ridgway, of Pennsylvania, has lately made a re-examination of the Mansfield coal mine, and says that the coal has improved 20 per cent. in quality by descending 80 feet deeper.

The Hoosick Tunnelling Machine has proved a failure. It cut into the rock, the account says, a distance of 25 linear feet, when the machine was pretty well used up. It progress was from 24 to 18 inches per hour, and the core which it drilled, had to be blasted out, which destroyed the work as far as it was performed, as it brought down the roof and all, to the amount of 300 tons of rock and earth.

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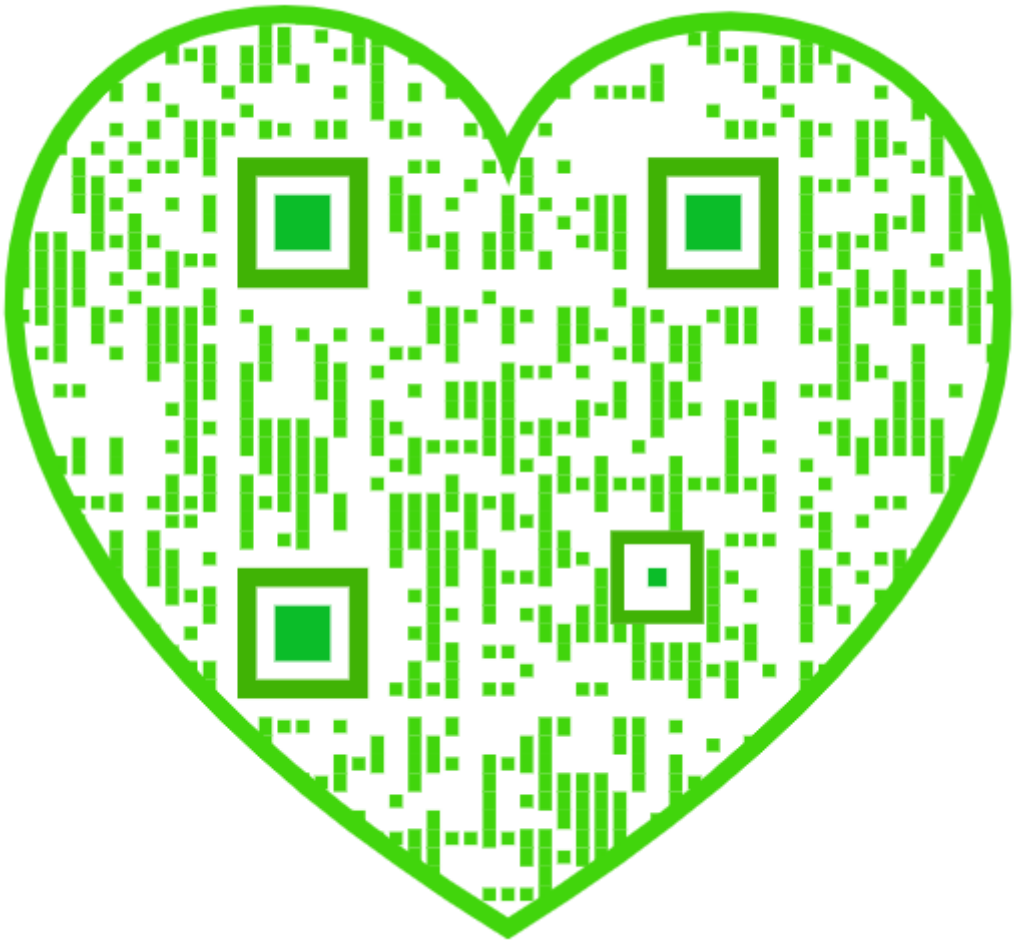

# MISCELLANEOUS.

[Reported expressly for the Scientific American.]

**Lectures on Chemistry.---No. 5.**

[An abstract of a Lecture on "Sodium and its Compounds," delivered before the Mechanics' Institute, at Cincinnati, Ohio, by Prof. Chas. W. Wright.]

The equivalent of sodium (natrium) is 23·27, and its symbol Na. This metal, like potassium, was first obtained by means of the galvanic battery, by Sir H. Davy; but when a large quantity is desired, the same process is had recourse to as in the preparation of potassium, which was fully described when treating of that substance.

Sodium is a white metal closely resembling potassium, and is so soft at common temperatures that it yields to the pressure of the fingers. It floats upon water, and has so great an affininity for oxygen, as to abstract it from that body, with the evolution of much heat, but the re-action is unattended with light, unless the water be heated. It is kept under the surface of naphtha, which contained no no oxygen, to protect it from the atmospheric oxygen. Salts containing sodium communicate a yellow color to flame.

Hydrate of Soda, or Caustic Soda: Na.O.H. O.—This substance is prepared in the same way, as caustic potash, the whole operation being conducted in the same manner as when that substance is made.

Like caustic potassa, this substance, when in solution, is caustic, and a powerful solvent for organic matter, and is used in the arts and manufactures for the same purpose as that body. With fatty matters, soda unites and forms a class of salts commonly known as "soaps," which are solid at ordinary temperatures, differing in this respect from the potash, soaps, which, under the same circumstances, are fluid.

As soda is an article largely consumed in the arts, the following table, by Dalton, will be found of great value in determining the strength of a solution of this substance, approximatively, by its specific gravity.

TABLE OF DENSITY.

| Density. | Percentage of real Soda. |
|---|---|
| 2 00 | 77·8 |
| 1·85 | 63·6 |
| 1·72 | 53·8 |
| 1·63 | 46·6 |
| 1·55 | 41·2 |
| 1·50 | 36·8 |
| 1·47 | 34·0 |
| 1·44 | 31·0 |
| 1·40 | 29·0 |
| 1·36 | 26·0 |
| 1·32 | 23 0 |
| 1·29 | 19·0 |
| 1·23 | 16 0 |
| 1·18 | 13·0 |
| 1·12 | 9·0 |
| 1·06 | 4·7 |

Carbonate of Soda: Na.O. $C.O^2$.—Almost all of the carbonate of soda of commerce is prepared from common salt, very little being obtained from the ashes of sea-weeds, which, in former times, furnished all of the carbonate of soda in the market.

The preparation of carbonate of soda from common salt being one of the most interesting and useful applications of chemistry to the arts, I cannot give a better idea of the process than by quoting the graphic description of it by Prof. Graham, it being borne in mind that sulphate of soda is formed as a step in the process of preparing carbonate of soda from common salt:—

"1. The sulphate of soda is prepared by throwing 600 pounds of common salt into the chamber of a reverberatory furnace, already well heated, and running down upon it, from an opening in the roof, an equal weight of sulphuric acid of density 1,600, in a moderate stream. Hydrochloric acid is disengaged and carried up the chimney, and the conversion of the salt into the sulphate of soda is completed in four hours.

2. The sulphate of soda thus prepared is reduced to powder, and 100 parts of it mixed with 103 parts of ground chalk, and 62 parts of small coal ground and sifted. This mixture is introduced into a very hot reverberatory furnace, about two hundred weight at a time. It is frequently stirred until it is uniformly heated. In about an hour it fuses; it is then well stirred for about five minutes, and drawn out with a rake into a cast-iron trough, in which it is allowed to cool and solidity. This is called ball soda, or black-ash, and contains about 22 per cent. of alkali.

3. To separate the salts from insoluble matter, the cake of ball soda, when cold, is broken up, put into vats, and covered by warm water. In six hours the solution is drawn off from below, and the washing repeated about eight times, to extract all the soluble matter. These liquors being mixed together are boiled down to dryness, and afford a salt which is principally carbonate of soda, with a little caustic soda and sulphide of sodium.

4. For the purpose of getting rid of the sulphur, the salt is mixed with one-fourth of its bulk of saw-dust, and exposed to a low red heat in a reverberatory furnace for about four hours, which converts the caustic soda into the carbonate, while the sulphur also is carried off. This product contains about 50 per cent. of alkali, and forms the soda-salt of best quality.

5. If the crystallized carbonate is required the last salt is dissolved in water, allowed to settle, and the clear liquid boiled down until a pellicle appears on its surface. The solution is then run into shallow boxes of cast-iron, to crystallize in a cool place; and after standing for a week, the mother liquor is drawn off, the crystals drained, and broken up for the market.

6. The mother liquor, which contains the foreign salts, is evaporated to dryness, for a soda salt, which serves for soap or glass making, and contains about 30 per cent of alkali."

In the above re-action, the sulphate of soda is converted into the sulphide of sodium by the coal, thus:—$Na.O.\ S.O^3.+2C=2C.O^2.+$ Na.S.; and the chalk or carbonate of lime converts the sulphide of sodium into the carbonate of soda, with the formation of the sulphide of calcium, thus:—$Na.S.+Ca.O.\ C.O^2.$ $=N.O.\ C.O^2.+Ca.S.$

When carbonate of soda is prepared by the above process it contains ten equivalents of water of crystallization, and when heated, undergoes the watery fusion. Its solution has an alkaline re-action and taste. It is soluble in two parts of cold, and less than its own weight of boiling water.

Nitrate of Soda, Cubic Nitre: $Na.O.N.O^5$.—This salt forms a regular stratum of great extent in the Pacific coast of South America. It is a deliquescent salt, used in the preparation of nitric acid, and for manure. From its attracting moisture from the atmosphere, and not so readily parting with its oxygen as nitre, it cannot be used as a substitute for that body in the preparation of gunpowder.

### Patent Office Reports---A New Law.

On the 24th inst., Mr. Cartter, Chairman of the Committee on Patents, asked the unanimous consent of the House of Representatives to report the following Bill:—

An ACT to regulate the report of the Patent Office, and providing for additional officers therein.

Sec. 1. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled That the Commissioner of the Patent Office shall cause to be prepared a general analytical and descriptive index or digest of all such discoveries, patented under act or acts of Congress, as he shall deem important to be made known and published, and of all such discoveries and inventions made in this country as tend to illustrate those so patented as aforesaid; to be accompanied with such proper drawings as are requisite for understanding the same; shall from time to time publish such portions thereof as are sufficiently prepared for that purpose, and distribute and sell the same as in his judgment will be the best for the public interests; and shall report the whole, when completed, to Congress. And the net proceeds of the sales hereby authorized shall be accounted for by him and credited to the patent fund.

Sec. 2. And be it further enacted, That in lieu of the list of inventions and claims heretofore contained in the annual report of the Commissioner of Patents, he shall cause to be prepared and embraced in his annual report short intelligible descriptions of the several inventions and discoveries patented during the year, accompanied with such drawings as are necessary for understanding the same, and an analytical and alphabetical index of the same, according to the subjects.

Sec. 3. And be it further enacted, That one compiler, with the annual salary of twenty-five hundred dollars; one assistant compiler, with an annual salary of fifteen hundred dollars; and one engraver, with an annual salary of twelve hundred and fifty dollars; and one additional examiner and assistant examiner, to be paid like those now employed in the Patent Office, shall be appointed in the manner provided in the second section of the act approved July 4th, 1836, entitled, "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose."

Sec. 4. And be it further enacted, That the Commissioner of Patents is hereby authorized to draw upon the patent fund from time to time for such sums as shall be necessary to carry into effect the provisions of this act, and they are hereby appropriated for that purpose.

[This Bill was received, and acted upon, and passed its third reading. It will no doubt pass the Senate and become a law. No one can object to its reasonable provisions. These we like—none of your appropriations to certain "magazines" for such work, as was recommended three years ago, and as was petitioned for by an interested clique in Washington in 1846. We have always condemned partizan appropriations, and ever will.

[For the Scientific American.]

### An Old Bible: its Vicissitudes and Wanderings.

In the "Scientific American," page 98, present volume, is published a notice of two old books; I have one several years older than either. It is a Bible and Prayer-book, printed by Robert Barker, in London, A. D. 1612, the size of the book is about 8 by 10 inches. It contains, first, the Book of Common Prayer and Administration of the Sacraments, next a genealogical table from Adam to the Virgin Mary, next a description and map of Canaan, next an address from the translators to King James; next a very lengthy preface to the readers by the translators, the books of the Old Testament, Apocrypha, and New Testament, and at the end are the Psalms of David, in metre, with notes to the first verses in most of the Psalms. The book is in a good state of preservation, and has been but little defaced or injured. Its history, so far as I know it, is somewhat romantic; it has on one of the blank leaves the name of "Ann Macbeth—born 1780;" she married Thomas Howell, a wine merchant, in London; he was burned out in 1832, saving but four things from the flames, and this old Bible was one of them. Shortly after he came to America, landing at New Orleans the night of the *great* shower of meteors, so noted throughout the United States. Mr. Howell left two daughters in England, one of whom married Horatio Guy, and the other Edward Burford—neither of whom have been heard of by the family in this country since their separation in England. Mr. Howell settled in Mississippi, but shortly afterwards removed to Texas, carrying with him three sons, and leaving a daughter not grown with some friends in Mississippi, near Natchez. In a short time the father, mother, and eldest son died. The Old Bible, with other goods, was packed up by the surviving brothers, to be sent to their sister in Mississippi, but while the boxes were waiting on the bank of the Brazos, for an opportunity to ship them, they were broken open, and every thing stolen, except the Old Bible, which, in due time, was received by the sister. One of the two surviving brothers shortly after died in Texas, the other returned to New Orleans, and has never since been heard of; the sister now resides in this place, and is in possession of the "Old Bible." B. C. Earle.

Pontotoc, Miss.

### War between the Courts and Corporation.

There is a conflict going on at present between the Judiciary of this State, and the corporate authorities of New York, about the grant of a railroad for Broadway. The legal gentlemen, we believe will come off victorious. An injunction was granted to restrain the city from proceeding with the railway this injunction the aldermen despised, and now they are to get paid for contempt of court. What will be the upshot we do not know. The case is a singular one, and the results will no doubt be very interesting and edifying to the Burgomasters.

### Impurity of Well Water.

The impurity of the Louisville water, so evident to a stranger who uses it for the first time, and so clearly demonstrable by a very simple chemical analysis, is also observed when an attempt is made to wash with it, especially with soap. The attempt is a very disagreeable one to a person accustomed to pure or soft water. It is true that this water is rendered somewhat softer by boiling, which causes it to deposit some of its lime and magnesia; yet the amount of soap annually decomposed and wasted, in the effort to wash in the hard water, would be found on calculation to be no small item of expenditure. Its dissolved earthy salts cause it to form a thick incrustation in the steam boilers in which it is used, which retards the action of the heat of the furnace, causes the more rapid burning of the bottom of the boiler, and thus renders probable more frequent bursting. For the same cause it is unfit for the use of the brewer, and for many uses to which water is applied in various manufacturing processes.—[Louisville, Ky., Courier.

[Magnesia in drinking water is unwholesome; it is believed to be the cause of cretinism in some parts of Switzerland and England. Lime water—carbonate of lime, is a soap eater. Hot slacked lime, strange as it may seem, cures the evil. A very small portion is required. It is now used in Manchester, England, in all the bleaching and calico print works, to make hard lime water soft. The people in Louisville will find a full account of the processes of making hard water soft on page 347, Vol. 7, Scientific American.

### Anthracite and Welsh Coal

In a very excellent article in the Journal of the Franklin Institute, by B. F. Isherwood, Chief Engineer, U. S. N., it appears that the Collin's steamers use anthracite on the voyage to Liverpool, and Welsh coal, also an anthracite, on the return voyage. The Welsh coal and Pennsylvania are nearly of the same value for raising steam. The consumption of coal in the Arctic in 24 hours is 85·48 tons, and no less than about 8½ lbs. per horse power per hour. The number of pounds of water evaporated with 1 lb. of coal is 7·539 lbs. by the anthracite, and 7·652 lbs. by the Welsh coal. The initial pressure of steam in the cylinders per stroke is 13 85 lbs; this is cut off at 4 feet 4 inches stroke, and with the vacuum the mean effective pressure on the pistons per square inch is 19 lbs.

### Woodcroft, Inventor of the Propeller.

Prof. Bennet Woodcroft, inventor of what is termed "Woodcroft's Propeller," has been appointed assistant to the Commissioners of Patents, in England, viz., the Lord Chancellor, the Master of Rolls, the Attorney General, and the Solicitor General. This appointment is for life; it was wholly unsolicited and given to him because he was an inventor and a man of science.

### Suffering in Maderia.

The grape is the staple article of food in Maderia, just as rice, and wheat, and corn are in other countries. Owing to the failure of the grape crop in 1852, the people of this Island are now in a very destitute condition. Subscriptions are being raised in this city to assist them. About $7,000 have been raised, and it is to be hoped that more will be contributed for the relief of these poor people.

### Caloric.

Some very singular movements are afloat about the Hot Air project. We are keeping watch and ward over the subject, and will be able to present some strange information on the subject in due season—we bide our time.

By the arrival of the steamer Australia, in London, from Australia, her cargo of over $5,000,000 was received, being the largest cargo ever carried in one ship. Australia is richer in gold than California. A nugget of gold for the Queen weighed more than one quarter of a cwt.

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### Machinery and Tools as they are.—Screws and Screw Cutting.

(Continued from page 155.)

The present generation, standing on the vantage ground of scientific knowledge, are too apt to contemn the laborious researches of the past seekers after truth, forgetting that the heights of science, whence they extend their gaze, were raised by the accumulated toil of ages now gone by, and that, moreover the science of the present will, perhaps be only the ordinary knowledge of the future. Actuated by such a feeling as that alluded to above, the first impulse is to smile at a mode adopted only fifty years since, for screw cutting, when the thread was traced first on paper, then the lines tranferred to an iron cylinder, and a guiding thread having been cut by a chisel and file, the operation was completed by a fixed cutter. Yet this rough plan was at that time regarded as the climax of ingenuity, and was carefully described for imitation; in truth it was a great advance over the previous methods, and its importance is increased ten-fold by the supposition that it was intended for the "boring-bar," then just invented, and which has so effectually superseded the boring machine previously used for engine cylinders, which boring machine was simply a boy who scrubbed the rough casting with a piece of pumice stone. To a person unversed in mechanics, the stress laid upon the necessity of obtaining excellence in screws may appear absurd and pedantic, but those most conversant with the subject, are also the most precise in their requirements on this point. A few words will explain the reason for this discrepancy of opinion; when a screw is employed merely to bind or attach one body to another, such exactness of workmanship is not required, and whether the pitch of the thread has any exact relation to the *inch*, is a matter of indifference as regards its individual usefulness. But in screws of a superior kind, or those which are termed "regulating" and "micrometrical," it is not alone sufficient that the screw shall be good as respects its general character, and as nearly as possible a true "helix" (a word denoting the peculiar shape of the screw), but it must also bear some defined proportion to the standard foot or inch, or other measure. This will be understood by explaining that micrometrical screws are employed in engines for the graduation of right lines and circles, and likewise for astronomical and mathematical instruments. In these latter the requirements of science appear ever to outstrip the most refined methods of execution, and a single instance will give an idea of the indefatigable perseverance with which some individuals have pursued this object. About the year 1800 two eminent mechanicians undertook to reform the old, imperfect, and accidental practice of screw-cutting, and succeeding in the attempt, have introduced the exact and systematic mode now generally adopted. As a preliminary proceeding, it was necessary to cut a very exact screw; each of them, therefore, cut a similar screw, 15 inches long, by a distinct process, and the two having been compared, they were found to agree exactly, but on being examined by a powerful microscope, these screws were discovered to be exceedingly defective. This rigid scrutiny led both parties to fresh and ultimately successful efforts. Without, however, entering into an account of the complex arrangements, by which such results were obtained, it will be more advisable to recur to the method adopted by hand turners to cut a screw, as their mode of procedure, perhaps, imparts most simply to the inexperienced, the theory of the subject.

All elementary works on mechanics tell us that the screw consists of an inclined plane wrapped around a cylinder; or, in other words, that it is a continuous circular wedge. These definitions afford an index to the manner in which a screw is made, for the turner, having formed a piece of metal to a cylindrical shape, next proceeds to cut the thread. This he does with a "screw tool," which is a straight flat piece of steel having projections and recesses exactly corresponding to the thread, but previously he "starts the thread," that is, lightly traces on the cylinder, as it revolves, a few threads similar, as near as possible, to the pitch of the screw he is to form, then stopping the motion of the lathe, he carefully examines his work to note the correspondence of the pitch, and if not sufficiently correct, he effaces the spiral mark he had made, with a turning tool, and commences *de novo*. If correct, however, he grasps the "screw tool," and presses it against the cylinder, which is rotating before him, in such a manner that the teeth or projections of the former touch the spiral line he had lightly cut, the incision being sufficiently deep to give a tendency to the "screw tool" to follow the course of the spiral. This inclination the workman encourages by a light pressure in the longitudinal direction, whilst, at the same time, he maintains the tool in a position favorable for deepening the incision in the cylinder. When the tool has traversed as far as it is intended to cut the screw, it is withdrawn from the work and again placed in its first position, which process is continued until the thread is cut as deep as desired. Had the screw tool been held at rest it would have made a series of rings, but no spiral, as many an amateur has found to his discomfiture. Should the tool fail to drop exactly into the groove at the commencement of the process a tolerably good screw may nevertheless be formed, as the error can be rectified. But if the difference should happen to be great, the tool finds its way into the groove with an abrupt break in the curve, and this error is often beyond correction. Should the tool be moved too rapidly, a double thread is sometimes the result, if too slowly the screw has only half the inclination intended, and the grooves are as fine again as the tool. The assemblage of points in the "screw tools," proper for metals and hard woods, renders the striking of screws in these materials comparatively certain and excellent, but the soft woods require tools with very keen edges, and therefore the "screw tool" is made with only a single point. With a tool thus constructed, no skill could cut a correct screw, unless a lathe with a traversing mandrel were used when guide screws are fitted as rings to the extreme end of the mandrel, and they work in a plate of brass, which has six scollops or semi-circular screws upon its edge. It will be understood that the tool remains stationary, whilst the work, which is chucked traverses with the mandrel, whose motion is determined by the above-mentioned guide screws. The alternating motion is effected by giving a swinging movement or partial revolution to the foot wheel, but the use of this arrangement is limited to a few trades. The self-acting screw-cutting lathe is the best machine for cutting accurate screws of considerable length or of great diameter. In this lathe, the traverse or longitudinal motion of the tool is effected by a long guide screw, which revolves in bearings and gives motion to the slide rest.

The screw receives motion from the mandrel by the intervention of geared wheels, so that the traverse of the tool is regulated by the number of revolutions of the mandrel. This affords a simple means of obtaining a screw of any desired pitch, for it is only requisite to regulate the ratio between the revolutions of the screw, and those of the mandrel, to obtain any desired result. This latter purpose is effected by changing the geared wheels, and therefore every lathe of this description is furnished with a number of "change wheels." The accuracy of the result now depends almost entirely upon the perfection of the guide-screw, which should possess, very exactly, some whole number of threads per inch, for, in fact, every screw cut by its aid is either a reduced or enlarged copy of its merits and defects. It will here occur to the reader, that if only a pair of wheels were used to move the guide-screw, its direction would be the reverse of that of the mandrel and work, for adjoining wheels always travel in opposite directions, but by introducing one or two intermediate wheels, either right or left-handed screws may be cut. The screw or chasing tools employed for this lathe resemble, generally, the fixed tools, except as regards their cutting edges. Angular screws are sometimes cut with a single point tool, the general angle of the point being from 55° to 60°, and when it is allowed to cut on only one side or bevel it may be used fearlessly, but if both sides are allowed to cut, more caution is required; for angular threads it is more usual and expeditious to employ a chaser. For square threads, a rectangular-shaped tool is general and the end alone is used to cut, a side tool being sometimes employed to regulate the width of the groove; there are, however, a number of peculiar tools and modes of working adopted according to the exigency of the case or the fancy of the workman.

(For the Scientific American.)

### Locomotive Invention----White's Truck.

In No. 17 of the "Scientific American," I find an article, under the head of "White's Patent Railroad Truck,—A Defence." I have no wish to engage in controversy with Mr. White or others, but simply to give my opinion on what is stated to be his invention, for when an invention is brought before the public it is open to criticism; and I must say, after reading his defence, that I am of the same opinion as before, and will endeavor to give reasons for it; in the first place, moving the eccentric cup to one side does transfer the weight of the locomotive so much to one side of the centre of the truck, by moving the centre pin with the longitudinal groove, which is the centre upon which the truck vibrates in order to accommodate itself to vertical inequalities in the track, so that whenever this centre is moved to one side, the weight upon two of the journals is greater than upon the other two, and, as I stated before, if moved much to one side, it would tend to cause the result it is meant to avoid. If the centre-pin, about which the eccentric cup is moved, was a part of the saddle, in place of the saddle resting upon it in the groove, then it would be free from this objection. Mr. White speaks of the loss that might result from taking a locomotive into the shop, in order to move the centre-pin, and the loss that might result in losing a trip in consequence, I will ask if the loss of time would not be much greater in substituting his apparatus in place of the ordinary centre. Mr. White would have us believe that the success of his truck is in consequence of his movable centre, and he does not tell us that the trucks, for which he substituted his, had side bearings, carrying the locomotive upon four, in place of three points, hence their liability to run off the track upon the Blossburgh road, any centre-bearing truck would have answered, and with such his truck ought to be compared, and not with such as are not calculated for even roads. Mr. White speaks of wedges in the pedestals, now the only proper use of such wedges is to adjust the driving axles, so as to get them perfectly at right angles with the cylinder, and to take up any play which may arise from the wear of the boxes and keys, and throwing the axles out of position by the wedges, in order to make the engine track, is like making two wrongs to make one right. The metaphor which Mr. White uses, about its not being prudent to carry five hundred pounds pressure of steam in a locomotive boiler, is strange; he says, "but it does not follow that because five hundred lbs. would tend to burst the boiler, that ninety or one hundred pounds may not be used with safety." It is like saying, well, if it would be unsafe to move the centre much to one side, moving a little wont do any harm; but allow me to ask if the centre-pin, being out of place (say one quarter inch), requires so much machinery, must it not be a serious evil? and the moving the centre to one side, by transferring part of the weight which belonged to the other side, cannot but be objectionable. Mr. White does not say that he is the inventor of centre-bearing trucks; but one might, from his article, presume that he was; the gentleman to whom he alludes as knowing Mr. Hudson, and his truck (which he never called his) —knows that locomotives with centre-bearings are not new, and that Messrs. Eastwick & Harrison put some locomotives upon the Rochester and Auburn Railroad, having such trucks with eccentric centre-pins for making the engine track, and they were used on the above road several years ago, so that Mr. White's invention is restricted to the peculiar combination of the eccentric cup plate, centre-pin, and saddle, in connection with the centre-bearing truck.

From an inspection of the drawings and description of Mr. White's Truck, as exhibited in the "Scientific American," I think my remarks will be understood, and appear plain to all practical men. It will not be necessary to allude particularly to the extracts of the letters from Hiram W. Bostwick, Esq., and W. M. Mallory, as what I have said applies equally well to their remarks. "Honor to whom honor is due," is the motto of the "Scientific American;" and permit me to say that I am not actuated by any personal or selfish motive but simply to vindicate the truth. Hoping that this will be satisfactory, I remain,

Yours, &c. W. S. Hudson.

Paterson, N. J, Jan. 10, 1853.

### How to Calculate the Power of Parker's Water Wheel.

The following article presenting the *modus operandi* for calculating the power of the Parker Water Wheel, is from J. Sloan Esq., of Sloan's Mills, of Floydsburgh, Shelby Co., Ky., who since we referred to his correct and extended information on this subject, on page 336, Vol. 6, Scientific American, has had many letters sent to him for information. This, it is hoped, will give all the knowledge required by future inquirers.

"My manner of computing the power of the Parker wheel is as follows, for a wheel of 150 square inches area of issues, and 3 feet diameter, under 9 feet fall, viz., $9\times64=576$; $24\times150=3600\div144=25\times62\cdot5=1562\cdot5\times9=14062\cdot5$ actual power of the water in pounds, theoretically with the assumption; the discharge is through a fair common aperture in the atmosphere. Diameter of wheel in feet $\times3\cdot1416=9\cdot4248$, then $24\times60=1440\div9\cdot4248=152\cdot89$ revolutions of the wheel per minute provided the velocity of the wheel is the same as the water. The result of repeated experiments I have made, proves the helical sluice of the Parker wheel, retards the water as 33 is to 30·75, which must be deducted; thus, 33 : 30·75 : : 25 : 23·295 cubic feet per second the practical or real discharge of the helical sluice without the wheel. I also found the wheel retarded the water in the sluice as 30 75 is to 25·5; hence we have 30·75 : 25·5 : : 23·295 : 19·3145 cubic feet, the real discharge through the wheel measured in the tale race, on the principle laid down by Du Bauts for measuring running water. I found it safe to allow the wheel's periphery to move 7 per cent. faster than the velocity of the water, a practice of 20 years' standing.

The Franklin Institute, in their report, 11th June, 1846, assert that a Parker wheel, under a fall of 10·10 feet, made 166 revolutions per minute, and the mechanical effect was 71 per cent., with 1110 cubic feet of water per minute; $10\cdot1\times64=646\cdot4$; $25\cdot424\times60=1525\cdot44$ the theoretical velocity of the water per minute. The diameter of wheel, $36\cdot5\times3\cdot1416=114\cdot668\div12=9\cdot55$ feet, the circumference of the wheel. Velocity of water $1525\cdot44\div9\cdot55=159\cdot73$ number of revolutions of the wheel per minute, provided the velocity of both were in unison. The wheel made $166-159\cdot73=6\cdot27$ revolutions of the wheel more than the velocity of the water theoretically. The area of inlet and issue of the wheel was 150 square inches $+1525\cdot44=229816\div144=1595\cdot944$ cubic feet per minute theoretically, 685·944 cubic feet per minute more than the actual quantity."

### Spot on the Sun.

A writer in the "Delaware Republican" calls attention to an unusually large spot on the sun, which may be seen through smoked or colored glass. The writer adds:—'By a rough measurement of the present spot, I found its diameter to be about thirty three thousand miles, consequently occupying an area on the sun's surface of eight hundred millions of square miles, equal to four times the superficial contents of the earth. The spot was visible this morning, and quantities of smoked glass were called into requisition in consequence."

Spots on the sun are very common; we remember to have seen three large spots on the sun's disc in the summer of 1836 (a very wet one) for at least three weeks. These spots are supposed to be less luminous parts of the sun's atmosphere.

A beautiful fire engine has been built by J. Smith, of this city, for the town of St. Andrews, New Brunswick Province.

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# NEW INVENTIONS.

### Self-Acting Hot Air Blast.

In the manufacture of iron, by the Blast Furnace, it is of the utmost importance that the pressure of the blast should be as nearly uniform as practicable, for which purpose an improved apparatus has been invented by Geo. Race, of North East, Duchess Co., N. Y., who has taken measure to secure a patent. It consists of a hollow metal valve, shaped like a box, and fitting loosely in a tubular socket of the same form as the blast pipe, but much smaller. The pressure of the blast upon the valve is regulated by a spring, and according to the degree of pressure it opens or shuts by a corresponding movement, two passages on the opposite sides of the socket. These latter are furnished with shutters or plates, working on a pivot, which are acted upon by the valve, and, according to the position in which they are moved, regulate the entrance of the hot blast into the tuyeres. In order that the quantity of air passing through may correspond inversely with the density, the area of the passages can be varied by adjusting the plates to a proportionate width and the working pressure may likewise be increased or diminished at pleasure, by means of a screwed rod connecting the valve and spring, and which serves to regulate the tension of the latter.

### Improved Rigging Screw.

An improved instrument of the above description combining lightness with strength, has been invented by E. B. White, of Nashua, N. H., who has taken measures to secure a patent. It differs from the one that is at present used in the shape of the stationary main jaw, which is hollowed out on the front and back, and strengthened with flanges, the screw working in a tapped hole serving as a nut, which is formed in a lug or projection of the stationary jaw. This screw is connected by a plate round its neck, to the movable jaw, which is furnished with lips that fit snugly on the flanges of the stationary jaw, and slide over them, as the screw is turned to the right or left. One of the lips being cast with the movable jaw, and the other made separate and screwed on. By this arraugement it will be seen that any sized rope may be placed between the jaws, and secured, as they can be moved to any requisite distance apart, or be brought as close together as may be required.

### Improved Roofing.

A new mode of roofing to supersede the use of shingles for that purpose has been invented by John McMurtry, of Lexington, Ky., who has taken measures to secure a patent. The roofing in this instance is made with planks, which are grooved in a peculiar manner, the upper lip being made narrower than the lower to admit the projections of a T-shaped plank called a capping piece, by which the lower planks are secured in their place and kept water-tight. In order to drain off any water that might otherwise remain in the crevices of the roof, and be absorbed by capillary attraction towards the centre joints, the lower planking is made somewhat concave, and a similar shape given to the under side of the top capping piece, so that a complete drainage is acquired by means of these gutters. The top of the capping piece should be preferably made oval, that being the best form to prevent the weather from warping it, and by having only one edge of the lower plank nailed down, ample provision is made for the swelling and shrinking of the wood, so as to prevent it from cracking or splitting.

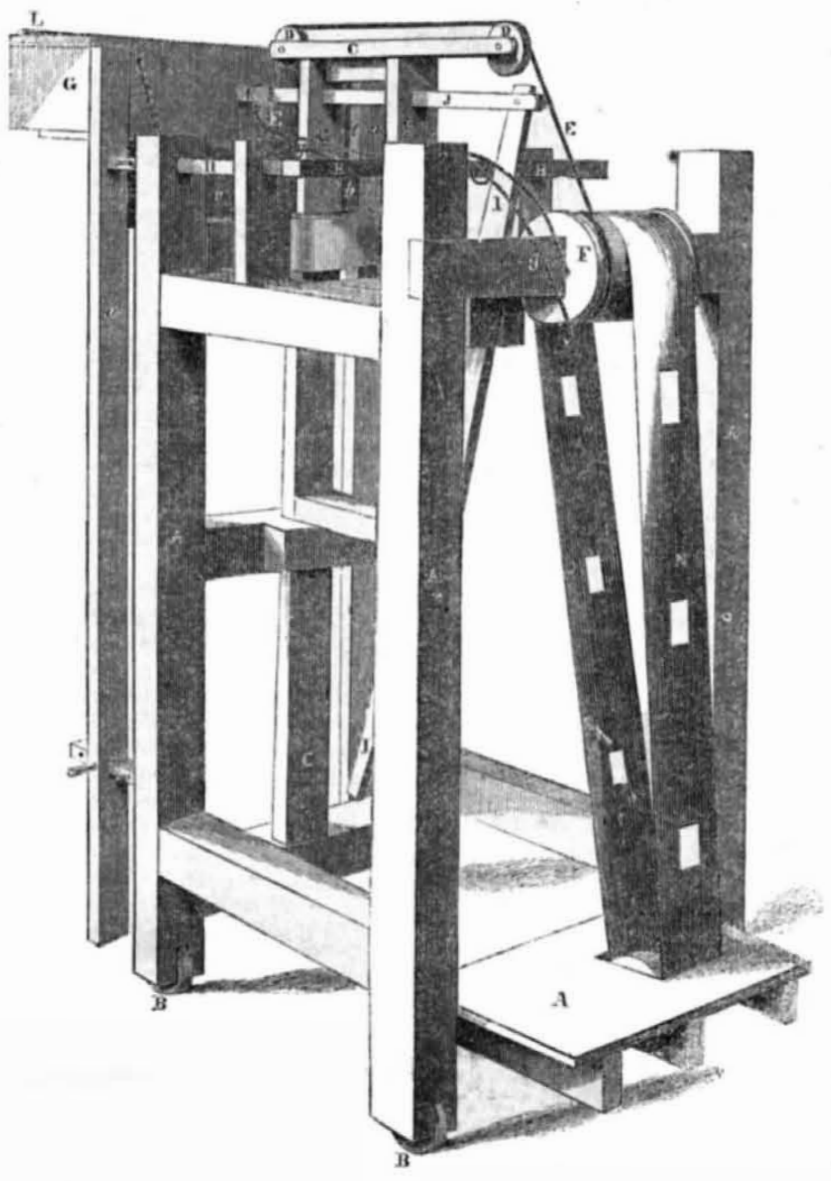
### Improved Clover Thresher.

An improvement on the above has been invented by Joseph and Charles Daniel, of Little Hanover, Pa., who have taken measures to secure a patent. The improvement consists in arranging the teeth upon the threshing cylinder in zig-zag lines along its length while those of the concave are placed obliquely from the edges to the centre. By having the teeth arranged in this manner the seed will be thoroughly threshed and separated, as it is subjected to two motions, being carried not only around the cylinder, but likewise moved towards the centre during the rotary motion, previously to being discharged upon the screen.

### Improved Melodeon.

Measures to secure a patent for the above have been taken by Edmund E. Shepardson and Edwin Lucas, of New Bedford, Mass. By the arrangement of the instrument in this improvement, the vibrating part of the reed can be lengthened or shortened at pleasure, and therefore any required tone may be easily obtained. To attain this desideratum, a tube or pipe, placed on the upper board of the bellows, is capable of moving lengthwise, and by this movement regulates the vibration of the reed, which fits in a slot in the under side of the tube. When the performer moves the tube it affects two clamps, which then approach to or recede from the ends of the reed.

## PLASTERING MACHINE.---Figure 1.




The annexed engravings are views of a machine for plastering the walls of houses, invented by Isaac Hussey, of Harveysburg, Warren Co., Ohio, who has taken measures to secure a patent for it.

Fig. 2.

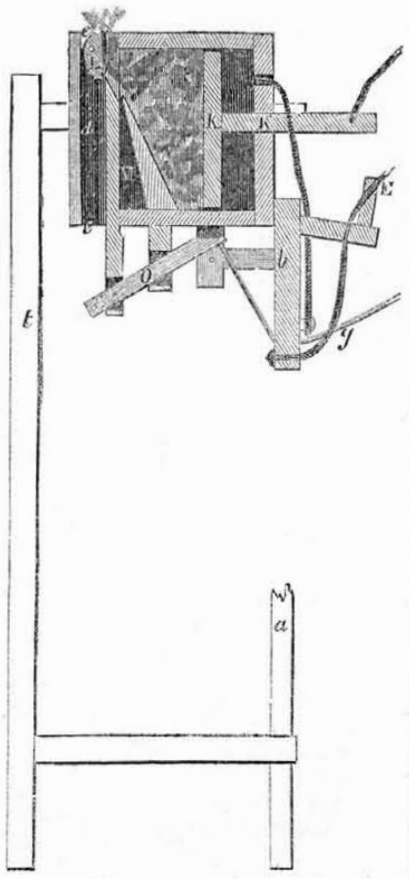



Figure 1 is a perspective view, exhibiting the machine plastering over-head, and fig. 2 is a vertical section of part of the plastering box. The same letters refer to like parts.

This apparatus consists of a frame resting on rollers or small wheels, and capable of being easily drawn across a floor; it has a mortar box capable of being elevated to the top of the frame, so as to project the mortar on the ceiling or roof of a room, by a piston acting on the mortar in the box; and then it is scraped and smoothed by an edge trowel, as the machine is moving along.

A A is the main frame; B B are the castors or rollers; C is an adjustable pulley frame, which is arranged to move up and down; D D are pulleys on the frame; E is a cord passing over them, from the windlass or drum, F. This cord is attached to the mortar box, G, which is capable of sliding up and down in vertical standards, *a a*, which have guide slots in them. This pulley frame is made to slide horizontally by the lever, I, which keeps the mortar box against a side wall, when the operation of plastering is being carried on, and it also operates the rod, J, and piston, K, seen in fig. 2, which works in the mortar box, and which, by pushing backwards and forwards in said box, forces the mortar upwards against the roof out of a narrow opening in the top of the box, and then by moving the frame along the floor, the trowel, L, situated at the back of the box, scrapes the mortar smooth to any line of depth, according as it is made to project above the cover of the mortar box. It is therefore capable of being set to any height, for this purpose, above the top of the mortar box, in the groove, *e e*, of the bar, *d*. The mortar box is attached to a sliding piece, *b*, which has two grooves, in which the rails, *a a*, slide, to allow the mortar box to be raised and lowered by the cross-piece, *b*, moving on these rails. M is a slide working in a groove, *f*, in the sides of box G. This slide closes the throat of the box, by working the lever, O, through the cord, *g*, which the operator draws at his pleasure. In fig. 2, the box is shown full of mortar, and the edge of trowel L, shown projecting such a height as to smooth the plaster nearly on a level with the top of the box. This trowel, according as it is set, serves to regulate the thickness of the coats.

It will be understood that, by operating the belt, N, so as to slacken off the cord, on drum F, the mortar box, when empty, descends, where it is filled by the operator on the floor; by putting the feet in the openings in the belt, or by having a handle on the lower drum, the box full of mortar, is then drawn up to its proper position for plastering on the top of the frame, when the operator commences to plaster by operating the lever, I, which actuates the mortar piston, K, and forces the mortar against the roof, as described, and as the frame is move along on its wheels, the trowel, L, scrapes the mortar in line and smooths it. For first, second, and third coats, the trowel is set to regulate their thickness. The mortar box is capable of being set in the frame (tipped over on its side from its present position) so as to plaster side walls. The mortar scraped off by the trowel on the roof, falls on the top of the box. The operator stands down below, and requires no skill to operate the machine or put on his plaster; any laborer could do the work.

More information may be obtained by letter addressed to Mr. Hussey.

### Improved Railroad Car Seat.

To travellers by railroad, there is nothing more desirable, and, at the same time, so rare as a comfortable seat. To furnish this desideratum, an improved car seat has been invented by William M. Warren, of Watertown, Ct., who has taken measures to secure a patent. By this plan a person may adjust the seat in a moment of time, so as to make it convenient for sleeping on, merely by raising a hinged back, which is attached to another fixed back—the car seat being hung on pivots, so that it can be more or less depressed as the movable back is raised. This is effected very simply by using a metal strip attached at its lower end to the cross-piece, which supports the pivots for the seat, at the upper part this strip is connected by a hinge to the adjustable back, in such a manner that when the back is depressed the seat is brought to a horizontal position, but if raised, the seat, by the action of the metal strip, is made to incline, a result due to the relative position of the hinges. The seat can likewise be made to face in any required direction, a spring securing it when adjusted.

### Inventor's Claims.

In the U. S. Senate, on the 24th inst., Senator Shields presented the petition of C. Ludwig Richter, of Washington, and made the following remarks:—

"The object of the petitioner is to have a part of the money which is proposed to be appropriated to Mr. Clark Mills set apart for his use and benefit. He states that he has learned that there is a proposition before Congress to make a donation of money to Mr. Mills, for his success in the construction of the Jackson equestrian statue. He represents that he is the person who invented the moulds, formed the moulding, and made the furnaces from which the statue has been cast, and that he is entitled to an equal share, at least, of whatever money may be appaopriated to Mr. Mills. I know nothing of the facts; but I deem it my duty to present the memorial, and move its reference to the Committee on Public Buildings.

It was so referred.

### Envelope Stamp.

G. F. Nesbitt, Esq., has shown to the Postmaster General an embossed stamp for prepaid envelopes, which has been accepted, and the manufacture will at once proceed. Such, however, is the labor and care required for their production, that none will be ready for delivery before the middle of next April.

The "Minnesota Pioneer" states that there are in that vicinity vast bodies of beautiful white sand, from which a superior article of glass may be manufactured.

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Scientific American

NEW-YORK, FEBRUARY 5, 1853.

### Inventors Secure Your Inventions.

For the honor and fair fame of an inventor, independent of any pecuniary advantages to be derived from his invention, his duty to himself and his friends, is to secure his invention by patent as soon as possible. He should not delay, but make haste to deposit the proots of his invention or discovery in the archives of the Patent Office. It is not an uncommon thing for men to rise up—or to have others rise up for them—and claim that they are the inventors of such and such improvements, while at the same time they have been indebted to others for everything that is worth claiming. Modest merit is often trodden under foot by presumptuous selfishness, but there is a way open for every inventor to protect his fame in the face of the whole world, and that is by depositing the proofs of his invention in the place provided by the laws of our country for that purpose. There is much brazen effrontery in this world, and those who deserve honor are not only often deprived of receiving it, but have the mortification of seeing mercenary adventurers awarded the prizes which they should have received. It was easy for others to cross the Atlantic in large ships and fleets after Columbus in his frail bark had showed them the way, and had there been no record left of his discoveries, the means by which he was robbed of giving a name to our continent, tell us that the intrepid sailor of Genoa would now be unknown as the discoverer of the New World. It is now but a short time since the late Chancellor of England, moved to the very depths of their hearts, with his impassioned eloquence, the Commoners in Parliament, by his funeral oration at the death of the "Iron Duke." But the eloquence was stolen from another, and the record—the undeniable proof was drawn forth to confront the elevated plagiarist. It is the same with some inventions which have been patented; when a boasting braggart comes up and claims that he has done what no man did before, and the gaping multitude runs after him, shouting "great is Diana of the Ephesians," the patent record of the invention is always incontestible proof to vanquish the selfishness, the pride and the vaunting of the upstart. For a while, the just rights of the real inventor may be overlooked in the heat and the fervor of an excitement; and there are men in every community, who, because they never heard of such a thing before, will not believe it (such is the morbid nature of some minds,) although the proof is presented to them in lines of the fairest character. But truth is always triumphant at last, when we can obtain evidence of it. We are only speaking about robbing inventors of their just claims, and awarding fame and honor to wilful wrong-doers. There is nothing more detestable than to hear invention pirates and their panderers defend themselves by such arguments as "oh yes, Watt, Fulton, Morse, &c., and all great inventors, had just such enemies as we have, there were men who claimed their inventions as there are men who now claim ours;" yes, we answer, and those pirates who opposed the just claims ot Watt and other true inventors, used just the same arguments as you do. Every invention controversy, must be judged upon its own merits, for every case has not a parallel. To prevent all controversy on the subject of inventions—the priority of discovery—there is ample means provided by our patent laws. This is the only true and proper way to provide against piracy, and inventors who do not fortify themselves with proof of their inventions against all future claimants, do injustice to themselves and relatives. When a man claims to have invented such and such improvements some years ago, we ask for his proof, and if he cannot show it by patent or in print, his claims cannot receive the least attention.

There are many inventors who invent what others have invented before them years ago, when proof of this is produced, we mean honest legal proof, all are satisfied, and there is no room left for controversy; but we hate to hear men—when others have brought out an invention—claiming it as their's, and bringing forth for proof, some six year old obscure conversations with others upon the subject. Away with such claimants; give us solid proof of your invention, and that is, "the patent you obtained for it."

It is a good thing that we have patent laws, if they served no other purpose than furnishing evidence of the genius of our inventors, and for affording proof to place laurel wreaths on the brows of the right men. To our inventors, we say, ponder well what we have said. The man who invents a useful improvement, whereby human toil is abridged, deserves a niche in the temple of fame, for he hath not lived in vain; "his life hath not been spilt in water." He should, as we have said before, in duty to himself, his relatives and descendants, leave no doubt resting upon the title of his invention, since without controversy, provision is made for this object by our patent laws.

### Railroad Accidents---Means of Prevention.

On the 15th of last April, a special Committee was appointed by the Legislature of the State of New York, to examine and report on the causes of railroad accidents, and the best means to prevent their recurrence. This Committee consisted of the State Engineer, Wm. J. McAlpine, Esq., and the Chairman of the Committee ot Railroads in the Senate, the Hon. H. Bartlett. They presented their Report on the 10th inst., and an able one it is. The report states that they (the Committee) examined personally the principal railroads in this State, and obtained information from the officers of several companies respecting the working and management of them. No less than 15 companies, however, failed to reply to certain interrogatories addressed to them. The Committee has come to the conclusion that the general causes of railroad accidents are:—

"1. Defective construction.
2. Improper management.
3. Impediments in the roadway.

Under the first head are embraced defects in the construction of railways, of superstructures, and of rolling stock.

Under the second head are included, the running of engines and trains of too great weight, and at too high a rate of speed for the grade, strength and capacity of the road; the employment of incompetent or improper agents and workmen; the want of proper and vigilant supervision; an insufficient system of signals, and want of due attention thereto; the failure of conductors to make their running time; the running of trains too closely following each other; the running of engines and cars too great a distance, without thorough inspection; an insufficiency of break power, and insufficient examination of the condition of the superstructure and rolling stock.

Under the third head are included, slides from the cuttings; persons and domestic animals upon the track; cars, hand-cars, gravel and wood trains, &c., left standing in improper situations; vehicles crossing the track; obstructions designedly placed upon the track."

One of the most apparent defects of our railroad management, says the report, is the want of sufficient *brake*-power. This power must be in accordance with the speed at which trains are run. Thus a train running at 10 miles per hour, and another at 20 miles per hour, the latter will require four times the brake power to stop it in the same time and space. The interval of space required to arrest a train, increases in the ratio of the square of the speed."

The remedies recommended for the prevention of accidents are "better inspection of the engines and cars; heavier rails and more substantial tracks, more competent managers, engineers, and general workmen, and more powerful brakes."

It appears to us that the chief causes of railroad accidents are bad tracks and bad rolling stock. If we had double tracks on all the lines, and these built in the most solid and substantial manner, and well fenced and watched so as to have no dangerous crossings and no stray cattle on the tracks, there would be no collisions, consequently there would be little necessity for powerful brakes.

On the other hand, if the rolling stock, axles, wheels, &c., of the engines and cars were sound beyond a doubt, there would be few accidents caused by the breaking of parts of the rolling stock. Competent men should always be employed, but careful steady men are more suitable than *smart* men. We humbly believe that a railroad can be built and managed to run trains at the rate of 80 miles per hour with greater insurance of safety to the passengers, than many of the roads now running at the rate of 20 miles per hour. And to do this requires no new discovery, nor the application of any stretch of genius, but simply the construction of double solid tracks with heavy rails, all fenced and secluded, and the employment of the best materials in the construction of those parts of engines and cars liable to tear and wear. By good tracks—we mean no narrow curves, miserable bridges, light rails, open crossings, &c., but solid foundations, wide curves, heavy rails, &c.' We hope the Legislature will move in the matter of double tracks; give us this reform first, and grant no charter hereafter to any railroad company unless they build a double track, and give the present companies having single tracks some space of time to make them double. Every dangerous embankment should also be fenced up so strong as no accident could possibly take place, like that by which our President elect recently lost his only and well-beloved son. It is a disgrace to our country that there are so many steep embankments unenclosed on our railways. There are on many of them yawning gulfs, where but a few inches from the rails a whole train is liable to be precipitated and dashed to pieces on the jutting crags below, by the least obstruction on the track. It is high time there was a reform, and a radical one in our railway system.

### Mechanics, Millers, and Long Hours.

We have received a very able and instructive letter from a correspondent, upon the subject of "Mechanics Respecting Themselves," and were it not too long for our columns, we would publish it. The intelligent author of it being pleased with the views expressed by us in the Scientific American, on page 117, agrees with us that our mechanics do not assume that position in society which their usefulness really entitles them to do, particularly that class—millers—to which he belongs. He says, "he believes they are lower in point of scientific and literary attainments than any other operative mechanics in the United States." This he attributes to the evil system under which they labor, and wrong notions of business men rather than any want of desire for improvement amongst mechanics themselves. This evil system is principally long hours of labor, and the notion among the owners of mills that capital is the foundation of labor, not labor that ot capital. This system, and these false ideas must be attacked and uprooted, he believes, before there can be an improvement in the condition and character of millers. We are of opinion that the American millers are as intelligent according to their numbers as some other tradesmen, but certainly they cannot be so intelligent as the mechanics in our cities and villages, whose hours of labor are so much less per day. This letter informs us that it is not an uncommon thing for millers in many places to work 18 hours out of the 24. Where such a system prevails, down it should go with a dash of the battle-axe of progressive common sense. Miserable machinery, we are informed, is the accompaniment of this miserable system, and this is always the case—crushing toil, and clumsy inefficient machinery always go hand in hand; we have never seen it otherwise. With improvements in machinery we have witnessed an improvement in the condition of the working classes—the makers and attenders of machines. In spreading abroad useful information respecting improvements on machinery, we consider that it exerts a happy influence in advancing the interests of employer and employed. It is a mistaken idea with men who own mills of any kind to think that they can make up for defective machinery by making their operatives labor unremitingly during more than ten hours per day. We have noticed that the operatives in those factories which employed the best machinery were the most tidy and intelligent. Since the abolition of the long hour system in England, the improvement in the condition and intelligence of the factory operatives has been gratifying to all men of benevolent feelings; since improved machinery has been introduced, greater care, assiduity and intelligence have been displayed by the operatives, and there has been a mutual benefit experienced by both factory owners and operatives. Short sighted men saw nothing but ruin in the proposed change of the English factory system; they have been happily disappointed, and those who at one time were most opposed to the short hour system, are now its strongest advocates. We hold to the doctrine that the interests of the employer and employed are one, however different their positions, and the specific duties of each; they may be compared to different parts of machinery in the same machine; when one part does not operate correctly, it tends to strain and injure the others. Persons who endeavor to create and foster antagonist feelings between them are neither wise nor upright. At one time we recommended that our manufacturers throughout the union should hold a convention and agree to work only ten hours per day, so that there might be a uniform superior system adopted—one that would be a credit to our country, and which would take away the refuge that a tory member of Parliament found for the old crushing factory system in Britain, by pointing to the long hour system in Massachusetts. Our best and most liberal minded manufacturers in this State stand ready, we believe, to adopt the ten hour system if made general. We would rather our manufacturers moved in this matter than the operatives, for it would conduce to their honor if the reform came through them, rather than to have it *wrung* from them by law.

### To Manufacturers and Dealers in Machinery

The suggestion made three weeks ago in our paper, that manufacturers and dealers in machinery would find it for their interest to transmit us circulars, setting forth what they had to sell, &c., has met with a hearty response from all quarters. A very large number have been already received from every part of the country, which have been properly filed and placed in a conspicuous position, where they can be easily inspected by any one desirous ot information. New additions are continually being received, so that there is no doubt a great want in the business world will be supplied by this original plan that we have now just started. Our only motive in so doing has been to benefit the above mentioned classes, who by the promptness with which they have responded to the call, show the necessity that existed for something of the kind. Innumerable letters have likewise been received by us from every quarter, expressing approval of our plan for opening a medium of communication between purchasers and dealers in machinery.

### Telegraph to the Pacific.

A memorial has been presented to Congress, asking for a grant of 1,500,000 acres of land, to be located along the line of a telelegraph, which the memorialists propose to build between St. Louis and San Francisco, by the way of Salt Lake City. The memorialists propose to give to the government, in return for the grant, the right, for ever, to transmit, free ot charge, over the line, all official despatches and communications with a preference over all others. The importance of the measure, they say, "is too great to be measured by the value of a few acres of worthless land." The scheme is a magnificent one; and so is the gift which they ask of Government.

### New York Crystal Palace.

Since our last notice of this building, the constructors have made some progress, but they must keep their fingers hot if they get it all ready as they have promised by the 1st of May next. The weather during the past two weeks has not been very favorable, and we shall have many stormy days before "moving day," there is therefore a marked necessity for hurrying up the pillars. We understand that those who took contracts for the castings have not been made rich by them, owing to the low prices, and the rise in the price of metal.

The California papers say that a pure diamond of seventeen carats has been found near Sonora.

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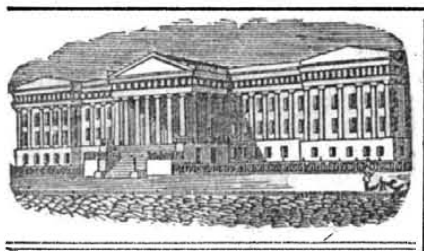

*Reported Officially for the Scientific American*

## LIST OF PATENT CLAIMS

**Issued from the United States Patent Office**

FOR THE WEEK ENDING JANUARY 25, 1853

JOINING CORNERS OF BOXES, &c.—By John Bell, of Harlem, N. Y.: I claim joining corners of boxes, &c., by means of double oblique parallel mortises and tenons, so that neither the sides nor ends can be separated or displaced, without previous removal of the top and bottom of the box, as set forth.

STEAM DIAPHRAGM PUMPS—By James Black & Orson Beecher, of Philadelphia, Pa.: We claim, first, the pipe, E, valves, L L, or their equivalents, so constructed and arranged as to draw the air, etc, from the condenser, and drive it into the discharge pipe or elsewhere, by the column of water in said pipe, operated by the working of the diaphragm, which causes said column of water to work the equivalent of an air pump to the condenser.

Second, the pipe, D, and valve, S, or their equivalents, so constructed and arranged as to draw the water from the condenser by the raising of the diaphragm, thus causing the water pump to work an exhaust pump or its equivalent, to the condenser, at the same time that it does its ordinary work, as described.

MANUFACTURING WIGS—By Charles Bourgard, of New York City: I do not confine myself to the precise means of giving motion to or adjusting the several parts essential to the operation of the machine; I know that it is possible to move and adjust them in other ways, to produce the same effect; and I do not claim the employment of the hooked or bearded needle, irrespective of the manner of its employment.

But I claim (for the purpose of making the partings, or those parts of wigs and all articles of a similar nature, where the artificial scalp or skin is visible and the surrounding parts), the employment of two or more adjustable slide frames for carrying the silk or other material, into which the hair is to be inserted, in combination, as described, with a reciprocating hooked or barbed needle, either the said frame or needle having such a movement as is necessary to insert the hairs at a proper distance apart.

TANNING—By Henry Bretney, of Sprinfield, Ohio: I claim continuously towing the hides in separated layers, through the tanning liquor, in such manner that each hide, made fast only at one edge or end to the towing mechanism, will be gently stretched and kept spread out by the resistance of the liquor, which is caused freely to circulate in contact with both sides or surfaces of the hides, whereby every hide of quantity, however large, is equally and constantly exposed to the action of the tanning liquor and the stretching action upon the hides adjusted, as specified.

SEWING MACHINES—By Freeman Palmer, of Conneaut, Ohio: I claim the arrangement and combination of parts, by which the material to be sewed is carried around under the needle, in a way to secure any required length of stitch, consisting of the shaft and the screw regulator, together with the lever and clamp, upon the feed wheel, substantially as described.

WEARING APPAREL, &c.—By Samuel M. Perkins, of Springfield, Pa.: I claim the art or method as described, of making seamless felt articles of use, and wearing apparel, by giving the batting of wool or fur the desired shape, and uniting its edges, where required, with silk or any other non-shrinking equivalent, or by such shrinking threads or fibre, as will resume their original state, when dry, substantially as set forth.

I do not claim the mode of carding or preparing the batting, as that was well known, long before my invention; nor do I claim the shrinking or felting process, as that has also been well known.

MACHINES FOR PARING APPLES—By Wm. H. Lazelle, of New York City (assignor to S. E. Fenwick, of Washington, D. C., & N. E. Smith, of New York City): I claim the apple paring machine, constructed with a stationary circular rack or way, in combination with a traversing lever, for operating the fork on which the apple or other article is placed, the said handle having a pinion on it, which traverses the said rack, and gives rotary motion to the fork, making the apple to revolve against the swinging spring knife, while the handle is pushed backwards and forwards in a horizontal direction, by the operator, in the manner described.

PIANOFORTES—By Joseph Piffaut, of New Orleans, La.: I claim, in combination with the metallic frame of a pianoforte, the movable part which supports the bridge, and which is raised or lowered at pleasure, by means of a key operating through the screws and levers, or their equivalents, for the purpose of raising or lowering the tone of the instrument, and at the same time preserving its accord, substantially as described.

SUGAR DRAINING MACHINES—By J. W. Archibald, of Porto Rico, West Indies (assignor to Horace Southmayd, of New York City): I claim the employment of a fibrous or flexible bag, made of cotton, linen, hair, cloth, or any other substance placed loosely or secured by loops, as described, in a centrifugal or depurating sugar machine, inside of the wire gauze cylinder, and containing the sugar, said bag not being permanently attached to the machine by any screw or clamp, &c., but to be freely placed in and lifted out of the machine entirely, when the sugar is depurated, as set forth.

GOLD WASHER AND AMALGAMATOR—By Abiather F. Potter, of Boston, Mass.: I claim, first, a wheel, or its equivalent, arranged in the tube above-mentioned, so as to be operated by the water containing the metals, &c, as it issues into or descends in the tube, so as to agitate the water by the motion of the wheel, whether it is made to operate some other agitating apparatus, or otherwise.

Second, the openings or their equivalents, in combination with the openings, or their equivalents, substantially as described, for giving such direction to the water as will move the mercury in the manner set forth.

EXPANDING DRILL—By Thos. Prosser, of New York City: I claim the combination of the inclined cutter, with a screw cut thereon, bevel screw pinion, or its equivalent, and collar arranged in the manner described, so that by holding said collar, during the rotation of the dril, a continuous feed motion is communicated to the cutter.

OMNIBUS REGISTERS.—By Peter Tatlavull, of Washington, D. C.: I claim the spring, operated and arranged in combinatien with the inclined planes and escapement tube, in the manner and for the purpose described.

WINNOWERS OF GRAIN—By A. B. Childs, of Rochester, N. Y. Patented in England May 22, 1852: I claim regulating the blast for the second winnowing of grain, by combining with the revolving fan, which generates both the first and second blast, and a compensating safety valve, as set forth, but I make no claim to a spring valve, in itself, as such a contrivance is well known for various purposes.

I also claim the self regulating valve, which prevents the admission of air into the machine, while it opens, to discharge the impurities separated from the grain, and thus prevents an undue accumulation of them at the bottom of the air chamber.

DESIGNS.

COOKING STOVE—By S. S. Jewett & F. H. Root, of Buffalo, N. Y, two designs.

WOOD STOVE—By S. S. Jewett & F. H. Root, of Buffalo, N Y.

COOKING STOVE—By J. G. Lamb, of Cincinnati, Ohio (assignor to Alex. Bradley, of Pittsburgh, Pa)

COOKING STOVE—By Jos. Pratt (assignor to Bowers, Pratt & Co), of Boston, Mass.

### Riddle's Report of the Great Exhibition.

[Continued from page 158.]

CRYSTAL OF COPPERAS, OR SULPHATE OF IRON.—This substance, so largely used in the arts for dyeing, &c., and also in chemistry and pharmacy, is obtained, as a natural product, from aluminous chalybeate springs, as well as by the spontaneous decompositon of certain native sulphurets of iron, or iron pyrites; and is prepared in large quantity by the action of air and water. The sulphur and iron are thus both oxidated; and sulphate ot iron, or copperas, is obtained by crystallizing the lixiviated masses.

Crystallization, and the circumstances under which it takes place, form an interesting subject of inquiry. Not having the operations of nature open to our inspection, our only sources of information relative to the formation of crystals are those afforded by the process of crystallization; and here, until very recently, our experiments were circumscribed by a very few modes of operation; that of the deposit of crystals from solution in some fluid; their production while gradually cooling from a state of fusion; and their volatilization by heat, or otherwise. Latterly, however, by the aid of that universal agent—electricity—new methods ot producing crystals have been pursued; and there can now be little doubt that all the phenomena of crystallization are governed, in a greater or lesser degree, by electric influence.

SPECIMENS OF CRYSTALLIZED ALUM AND BICARBONATE OF SODA.—The first of these products is also extensively used in the arts, as well as in chemistry and medicine. It is an earthy salt, and occurs in a native state only in small quantities. In a great measure, however, it is prepared artificially from alum slate—a rock belonging to the coal formation and containing a considerable proportion of sulphur, iron, and alumina. The slate is broken in pieces, roasted, exposed to air and moisture; and, the soluble parts being dissolved in water, crystals of alum are obtained as the solution cools.

Bicarbonate of soda is chiefly used in medicine, and may be obtained by passing carbonic acid through a concentrated solution of the carbonate.

CAMPHOR AMD BORAX.—Camphor is one of the principles arising from the separation of the volatile oil of two trees; the one, a native of Japan and China; the other, a native of Borneo and Sumatra. From these it is procured by different processes. It exists in every part, root, stem, branches, and leaves of the first-mentioned tree, which is chopped into pieces sufficiently small to be thrown into iron vessels. These vessels are afterwards covered with earthen hoods, in which are placed rice, straw, and rushes; heat being subsequently gradually applied. The camphor is volatilized, and afterwards condenses on the straws, rushes, &c. This, after being purified from the intermixture of straw, is found in commerce under the name of crude camphor; but it still retains many impurities, and on arrival in Europe is refined. The tree is familiarly known in this and other temperate countries as an ornament of conservatories. It is a graceful evergreen tree, whose wood and leaves emit, when bruised, an agreeable camphorous odor. In the camphor tree of Borneo, on the contrary, the volatile oil is not procured by distillation. The camphor here occupies the pith of the tree, existing in its stem, in a crude solid form, along with camphor oil,

Camphor has been long and extensively used in medicine; but even yet its physiological and therapeutic actions have not been fully discovered, from the fact that more systematic inquries have not been made as to its medicinal results.

Borax is, in reality, a compound of boracic acid and soda, correctly termed biborate of soda. It is chiefly brought from the East Indies, Persia, and Ceylon, and also from a lake in Thibet entirely supplied by springs, where it is collected by the natives from the edges in a state of crystallization. It is imported under the name of tincal. The crystals are bluish, or greenish-white, and sometimes nearly transparent, as well as soft and brittle. It is purified by solution in water and crystallization, and is then sold as borax.

On the continent, borax is prepared by decomposing carbonate of soda with the boracic acid of Tuscany, and purifying the biborate by various processes.

Little is yet known of the medicinal actions ot borax. Its chief use in the arts is for glazing porcelain and making green fire.

FERROCYANIDE OF POTASSIUM, USED FOR DYEING BLUE, IN PLACE OF INDIGO.—This is perhaps one of the most important chemicals used in the art of dyeing, and calico printing. Its preparation consists in projecting a mixture of pearl ashes with hoofs, horns, and other animal matters, in the proportion of two to five, into a red-hot iron crucible, and stirring diligently the pasty mass thus formed until fetid vapors cease to arise from it.—When the product has cooled, it is lixiviated with cold water, filtered and concentrated, upon which yellow crystals of ferrocyadine of potassium are formed. By the addition of a salt of iron to ferrocyadine of potassium, that most beautiful blue, called Prussian blue, is produced.

A PYRAMID OF BEST TABLE SALT, WITH SEVERAL OTHER SPECIMENS OF SALT.—These specimens of salt were from the extensive mines of Northwitch, in Cheshire, where there are also brine springs. They are of two kinds—the one white and transparent, the other of a reddish-brown. The rock salt is found from 28 to 48 yards beneath the surface of the earth. The first stratum is from 15 to 20 yards in thickness, extremely solid and hard, resembling sugar candy. Many tons at a time are loosened by blasting with gunpowder.

The second stratum is of hard stone, from 25 to 35 yards in thickness. The salt lies beneath this stratum in a bed above 40 yards thick, generally perfectly white, and clear as crystal. It is stated that the annual production of salt in England is upwards of 800,000 tons, and the population engaged in its manufacture 11,000 to 12,000. The sources of supply are said to be inexhaustible; and latterly the salt manufacturers have so far extended their works that the opening of a new market would be of the greatest advantage.—Common salt, for ordinary purposes, can now be obtained at about 20 shillings sterling per ton. In India, the British government monopolizes both the manufacture and sale of salt, and the exportation of British salt to India is prohibited. Attempts have been made by the salt manufacturers and ship owners to obtain admission for British salt into the ports of India at a moderate duty; and the latter, especially, complain of the disadvantage of not being allowed to take so convenient an article of merchandise to that part of the British empire. The salt monopoly had existed in India long before the sway of the East India Company commenced; and its modification, and total abolition, is considered only as a question of time. It is believed that a moderate duty on salt would soon yield quite as large a revenue if the monopoly were abolished, while commerce would be benefitted by the exchange of sugar and other commodities for salt; smuggling in salt, which is extensixely carried on, would cease; and, in place of arbitrary and harsh restrictions, the consumer would obtain a better article at a much cheaper rate.

REFINED INDIGO.—This substance is the innoxious and beautiful product of an interesting tribe ot tropical plants, and is very extensively employed in dyeing and calico printing; being esteemed the most useful and substantial of all dyes. When the plant is in full flower it contains most coloring matter. It is then cut, dried, and put into vats, and covered with water; fermentation takes place, accompanied with the evolution of carbonic acid, and other gaseous products, and the yellow liquor is covered with a froth. This froth, in a little time, becomes of a violet color, and a substance is evolved which is rendered blue by absorbing oxygen of the air, and, being thus rendered insoluble, is precipitated. This, when, collected and dried, is indigo.

SPECIMEN OF ULTRAMARINE.—This is a well known blue pigment of extraordinary beauty. Until within the last few years it was entirely prepared from the lapis lazuli, or lazulite, and from the great costliness attending its preparation, its use was confined to the artist. It is now prepared, artificially, at a very moderate rate, and equal in beauty to that obtained from the lazulite. It is stated that by adding freshly precipitated silica and alumina, mixed with sulphur, to a solution of caustic soda, evaporating the mixture to dryness, and placing the residue in a covered crucible, and exposed to a white heat, where the air has a partial access to it, a pure ultramarine is obtained. The product is then reduced to impalpable powder. The proportions of materials to be used are about 36 silica, 36 alumina, 24 soda, and 3 sulphur. Since this discovery, its value has become very much reduced, and it is now used extensively in the arts.

### A Specimen Business Letter.

We have received the following "original" letter from a correspondent which we publish for the *edification* of our readers. It is a transcript of a numerous class of the same kind with which we are continually *bored*, as if, forsooth, we had nothing else to do or think of but to answer the innumerable questions that are continually put to us upon subjects with which we are totally unconnected. We are always ready to give every possible information to our readers upon any subject on which they may wish to be enlightened, but really, it is taxing our good nature too much to suppose that we can waste our time upon such petty trifles. We therefore hope that the accompanying specimen of editorial correspondence will be the last of the sort with which we may be annoyed, and that our correspondents will, for the future, confine their inquiries to those subjects for which our paper is intended:—"Pop-Corn Flour" and "Apple Butter" are not exactly in our line.

"How would pop-corn flour answer for bread in your city, and what would it probably be worth a barrel? Do you suppose tomatoes would sell well in your market put up fresh—being the same as when taken from the vines, ripe and fresh, pared, with the hard core taken out at the stem, &c.? Would fresh applesauce sell in your market? I do not mean apple-butter, as usually made, and called apple sauce—but fresh as when made from the apple, fresh for table use, &c.—put up as the tomatoes. How can eggs be put up to keep from March till January, and be safe, &c.? What is the best method to put up butter in the summer to keep, say until January, &c.? Can the Tinman's Guide be had in your city? Also, the Mechanics' Calculator? What mode is best to keep apples from fall to the next spring? Some time ago I saw in your paper, and in some other papers, a great ado about a man who made a tea-kettle out of a half-cent. piece. What would you think of a tea-kettle only weighing the twelfth part of a cent., would this not surpass the one made out of a half-cent piece, &c.? N. B. Would it not be a greater accomplishment to double seam a globe without having any thing in the inside upon which to seam, and not have a hole in it through which to pass an instrument to work upon, than to make the tea-kettle as above spoken of, &c.? Is McCord's receipt the best out for making soap, and the least expensive? What do you say? I see, in your paper, that you do not speak favorably of the American Palace, &c., will it be a failure?"

The above letter we give as received by us, omitting, of course, the name of our correspondent.

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### TO CORRESPONDENTS.

C. F., of Iowa—Instead of charging you a dollar for the information you solicit, we have credited you for 6 months subscription, and sent a back number of the paper containing just the information you solicit: hope every one of the 26 copies you will receive may be worth a dollar to you.

W. E. L, of Ohio—We duly received and filed your letter respecting the "syphon;" our opinion has not been changed. We have no knowledge of the publication to which you refer. You should submit your inquiry to some lawyer in your place; it does not come within our province.

C L, Jr., of Ct.—It would depend entirely on your management of the affair after it was patented; many fortunes have been made on worthless patents, while meritorious inventions have lain dormant for want of energy and capital to introduce them to the public. The pecuniary worth of most patents lies in the ability of the managers of them.

M. O. R, of St. Louis—A set of volume 6 was sent to you, addressed to the care of Mr. Byrne, on the 7th ult.

S C. M., of Ind.—We sent your Letters Patent and wood engravings to you by Express on the 29th ult. $12 received.

P. P. of N. H., and F. L. A., of Ct.—Your letters were both received by one mail, each asking the same question; in reply to them we would state that the plan of arranging brakes to act upon the upper periphery of the wheel, using the weight of the car as part of the applied power, has been very often suggested to us.

L. & L., of N. Y.—We must have the first use of the cuts or we cannot publish them at all. As soon as you send us a better drawing and a more full description, accompanied with $12, we shall prepare the engravings, and will insert them soon.

S. T. T., of N. Y.—Your plan for dressing mill stones has been tried but found not to be practicable.

A. C. R., of Ohio—We do not remember what your communication was, but presume, if you sent one here and it was not inserted, it was thought not of sufficient interest to pay for the room it would occupy.

E. F., of N. J.—Your chemical balance appears to be new, useful and patentable.

S. B., of Ind.—You spoke too late, your specification and drawings have been filed in the office several weeks. We have nothing to get up an engraving from at present.

H. G. H., of N. Y.—Messrs. Birbeck, in this city, make good boilers, as do Messrs, Pease & Murphy; in fact they are built in all our large engineering establishment. Initial horse-power is a very indefinite term. Your engine of 8 inch bore and 2 feet stroke will be about 5 1-5 horse-power, that is, at 21 lbs. pressure.

D. S., Jr., of N. H.—The machine you describe would probably infringe upon the Blanchard Lathe.

W. B., of Pa.—The best flue for wet tan bark is a round one, but the form of flue will not remove the evil of the vapor.

A. B.. of Pa.—Your plan for a grain separator, we think, is new and patentable, but the butter preserver, we think, lacks sufficient novelty. The pump matter we will take into consideration.

C. W. B., of Ohio.—The diagram you sent of the harvesting machine, we believe illustrates a new invention, but we have our doubts of its being as good as many others. Your plan for taking and registering votes was illustrated in Vol. 2, Sci. Am.

C. E. W., of S C.—We have a new edition of the Patent Laws in press, which will be out and ready for mailing in a few days. The coating of lightning conductors with block tin would be no more patentable than covering a sheet iron dish with the same material, and thus rendering it a "tin pan."

J. A. H., of Pa., and J. M. J., of Ky.—We have none of the back numbers previous to January, with which we can furnish you.

☞ Owing to the illness of one of our number, who usually attends to corresponding with inventors, we are necessarily obliged to let several letters remain over unanswered until next week.

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Money received on account of Patent Office business for the week ending Saturday, Jan. 29:

J. T., of Ill, $55; V. P. & B. K., of N. Y., $10; F. H., of Pa, $55; E. St J., of N. Y., $55; M. B. D., of Pa., $39; H. G. R., of Tenn., $50; L. D., of N. Y., $30; J. M. H., of N. Y., $30, W. T. B. M., of N. Y., $100; W. T., of N. Y., $20; J. C. S., of Pa., $30; E. G. H., of N. Y., $30; J. S., of Ky., $10; E. C. B., of N. Y., $25; J. B. D, of N. Y., $30; W. C., of Mass., $30; H. W. W., of N. Y., $20; E B. W., of N. H., $20; B. B., of N. Y., $25; S. & L, of Mass., $30; J. McM., of Ky., $20; G. S., of N. Y., $45.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan. 29:

S & L., of Mass; F. F., of Mo.; J. C. S, of Pa.; W. T., of N. Y.; W. McB., of Ohio; B. B., of N. Y; J. McM., of Ky.; G. R., of N. Y.; J. K., of N. J.; E. B. W., of N. H.; G. S., of N. Y.

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### A Chapter of Suggestions, &c.

BACK NUMBERS AND VOLUMES—In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:—Of Volumes 1, 2 and 3—none. Of Volume 4, about 20 Nos., price 50 cts. Of Volume 5, all but four numbers, price, in sheets, $1. Of Volume 6, all; price in sheets, $2; bound, $2,75. Of Vol. 7, all; price in sheets, $2; bound, $2,75. Of Vol. 8, all the back numbers to January 1st (No. 16), but none previous.

## ADVERTISEMENTS.

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**MORTISING MACHINE**—"Dear Sirs, I received the Portable Mortising Machine about three weeks ago; I have used it, and am very well pleased with it; it is the best plan of a machine of the kind I have ever seen. W. R. McFARLAND.
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"Since I have been a subscriber to your paper I have purchased one of your Mortising Machines, for which I would not take double its price and do without it. WM. M. FLEMING.
Elizabethtown, Tenn., Jan. 8 1853."
This machine is simple, durable, and effective, and is boxed and shipped for the low sum of $20
MUNN & CO.

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**E. OLIVER'S WIRE WORKS**—No. 25 Fulton st, corner of Water. Locomotive Spark Wire, Patent Self Setting Revolving Rat Traps; a new invented enclosed Coal and Ash Separator, and Wove Wire of every description. 21 3*

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**INFORMATION WANTED**—Was the Aneroid Barometer in use in the United States prior to August 20, 1846? Address "H. E.," box 773, Post Office, New York. 1*

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**THE STOWELL EVERGREEN SWEET CORN** A few bushels of this new and valuable variety; from seed raised by Professor J. J. Mapes, L. L. D., for sale. Per bushel, $16; peck, $5; half peck, $3; quart, $1; sent by express to any part of the country, on receipt of the money by mail. This is beyond all doubt the best and most prolific kind of Sweet Corn ever grown. No farmer should be without it. One of the advantages claimed for this corn by Professor Mapes, is that it may be kept green and fresh all the year round. The subscriber's limited experience, however, does not enable him to endorse this. Address, post paid, ALFRED E. BEACH, White Plains, Westchester Co, N. Y.
[Prof. Mapes, in the "Working Farmer," December, 1851, gives the following directions for preserving the Stowell Evergreen Sweet Corn:—
"The ears should be gathered when fully ripe, and the husk should be tied at the nose (silk end), to prevent drying, when the corn will keep soft, white and plump for more than a year, if in a dry and cool place. At the dinner of the Managers of the fair of the American Institute, last year, we presented them with this corn of two successive years' growth, boiled, and there was no perceptible difference between the two. This year we sent to the fair a stalk containing eight full and fair ears, and we could have sent many hundred stalks of six ears each." 20tf

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**STEAM ENGINES FOR SALE**—We offer for sale two Engines and Boilers, as follows: one 8 horse, horizontal, cylinder 7 inches bore, 16 inch stroke, on a cast-iron bed, fly wheel, driving pulley, governor, pump, pipes, etc.; has never been used. The Boiler has been used by the maker about one year. It is cylinder, horizontal, 16 feet long, 30 inch diameter, has a steam chamber, try-cocks, check and safety valves: price, $600.
One 7 horse Horizontal Engine, 6 inch bore, 16 inch stroke, cast iron bed-plate, driving pulley, etc. Boiler horizontal, tubular, and has everything complete for putting it in operation. The engine is new, the boiler has been used, but is in good order. Price $500. They are rare bargains, and will give satisfaction to the purchaser, being much less than new ones can be obtained. Address MUNN & CO.

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**MANUFACTURERS OR OTHERS,** who have Wool, Cotton, or their fabrics, to dry by artificial heat, will find it greatly to their interest to use Chaffee's Patent Drying Machine, or Hydro Extractor. Having purchased of Mr. Chaffee the right to manufacture, sell, or use the above-named machine in any and all parts of the United States, and having been manufacturing said machines for more than three years, and having introduced the main improvement by which the machine differs from the original, as seen in Vol. 4, No. 10, compared with Vol 8, No. 19, Sci. Am. I am prepared to furnish, on short notice, as good a machine, and as cheap, as can be had from any source Price, according to size, from $100 to $300. CHAS. BURNHAM,
212* Springfield, Mass.

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**SHINGLE MACHINE**—WOOD'S PATENT—JAS D JOHNSON, of Bridgeport, Conn., proprietor of this justly celebrated machine, is now on a tour through the South western States, and will exhibit the machine in operation in the principal towns and cities. Notice will be given in the local papers where and when it may be seen; he will dispose of machines and rights upon reasonable terms 9tf

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**APPLICATION** will be made to the Commissioner of Pensions for a duplicate of Land Warrant Certificate No. 63,062, issued by the Department in 1849, to Roxena, widow of Silas Salsbury, late of 2nd U. S. Infantry; said warrant was assigned by her to E. C. Church, and by him to me Oct. 1st, 1849, and was stolen from me the 16th January, 1852, at the Hudson R.R. Depot, New York City.
CHARLES D. NIMS.
January 24th, 1853. 21 6*

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**MACHINERY, TOOLS, &c.**—The subscriber is prepared to manufacture all kinds of light machinery, also Lathes, Slide-rests, and Engineers' Tools, &c, at short notice and on moderate terms. Engineers and inventors giving him a call will have their work got up with accuracy and despatch.
21 4* S. BENTON, 136 Crosby st, N.Y.

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**CLOCKS FOR CHURCHES,** COURT HOUSES AND OTHER PUBLIC BUILDINGS, Time-Pieces for Session and Vestry Rooms Hotels, Rail-Joads etc.; Regulators for astronomical purposes, Jewellers, and others, when the most perfect time is desired. The improvements introduced by the subscribers, enable them to warrant an accuracy of time-keeping, unequalled (so far as they can learn) in Europe or America. Glass dials, for illuminating and other kinds, furnished. Address SHERRY & BYRAM, Oakland Works, Sag Harbor, Long Island.
"At the Oakland Works of Sherry & Byram there are made some of the finest clocks in the world."—[Scientific American. 19 13eow

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**THE UNDERSIGNED** manufacture Patent Cast-Iron Screw Pipes, of 3-4, 1, 1 1-4, 1 1-2, 1 3-4, 2, 2 1-2, and 3 inches in diameter—now in extensive use for gas, steam, and water, being cheaper and more durable than copper, lead, or wrought-iron pipes, and available for the same purposes. This pipe has been largely used in conducting water to railroad stations, also in tanneries, distilleries, pork and sugar houses, in conducting water or steam, and as suction pipe for pumps, for which, where long lines are required, it is peculiarly fitted, from its durability, cheapness, and the excellence of the screw-joints. We also make Solid Hub Railroad Car Wheels, by Murphy's process, using the utmost care in selecting metal for the purpose, with reference to strength and chilling properties. Also small steam engines, mill machinery, cotton presses, tobacco-screws and presses, lard, timber, and mill screws; force and lift pumps of various sizes and kinds, for hand use or power Cast-iron railing Roys & French's Patent Hub Mortising Machine, which will lay off, bore, and mortise a hub of ordinary size in 15 minutes, turning it out completely finished, the mortises having any required disc
TEVIS & BARBAROUX,
corner of Washington and Floyd streets,
20 4* Louisville, Ky.

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**BRIDGEWATER PAINT MANUFACTURING** COMPANY DEPOT, 125 Pearl and 78 Beaver streets, New York, have on hand a large supply of this paint, and are prepared to receive orders for dry packages of 200 lbs. and upwards, and in oil of assorted colors in kegs of 25, 50, and 100 lbs. For wood, iron, stone, and brick work, it has no equal. Painters are using it with great success on brick buildings (the natural color resembling brown stone), on tin, canvas, or shingle roofs, villas, barns, fences, depot buildings, railroad cars, bridges, &c.; also for decks and bottoms of vessels. The black has been found superior to any other, for hulls of vessels, being more durable, possessing a greater body and cheaper. From its spark and cinder-proof qualities, it is well adapted to all kinds of wood work, where there is danger from fire. Testimonials of its virtues, and specimens on wood, tin, canvas, &c, may be seen at the depot. Letters must be addressed to
20 4* R. BOGERT, General Agent.

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**NEW BRICK MACHINE**—For a full description see Sci. Am., No. 49, and engraving No. 52, last Vol. A six-mould machine, driven by steam, makes 15,000 a day; cost, $500 without engine. A 5-mould by two horses attached to a sweep, worked by two men and five boys, makes 10,000 a day; cost, $300. A 4-mould, by one horse, one man and five boys, makes 8000 a day; cost, $250; may be mounted on wheels and moved about, Persons remote may be supplied with model, drawings, and set of patterns or castings. Maryland Institute, Nov. 24.
To the Committee on Awards—By your request we have made a re-examination of the Brick Machine of Mr F. H. Smith. The work is now done in the most efficient manner and by the slightest improvement imaginable. A further improvement is in the method of delivering the bricks from the moulds, which goes far to facilitate the entire operation. We are of opinion that the machine will prove a great acquisition to those engaged in the business, especially in country places where they have not the benefit of experienced hands, as the whole is performed by ordinary labor. The bricks made by it are well formed, substantial, and all that can be desired. —Wm Slicer, L. P. Clark, John C. Ely, Thos. Wiggins, C Reeder. December 17th—By unanimous vote Gold Medal awarded.
Address, FRANCIS H. SMITH,
17 3eow* Baltimore.

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**E. HARRISON'S** UNEQUALLED FLOUR AND GRAIN MILLS—Their frames and hopper are cast-iron, and the stones French Burr, 30 inches in diameter; grinds of wheat and corn 20 bushels an hour, weighs 1400 lbs.; cash price $200. These mills, constructed upon a new principle, have become widely known, and are producing a revolution in milling. Cash orders promptly supplied, and the mills warranted to work in the best manner. The patentee offers $500 reward for any mill which will do an equal amount of work with the same power and dressing. Made and for sale at the corner of Court and Union streets, New Haven, Conn, by
20 12* EDWARD HARRISON.

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**BACK VOLUMES OF THE** SCIENTIFIC AMERICAN for sale—Vols. 2, 5, 6, and 7, complete, price $2.50 per volume; Vol 3, less 10 or 12 numbers, and Vol. 4, less 4 or 5 numbers; price $1,50 each; all bound and in good order. Address, post-paid. F. S. BURRELL, Albany, N. Y. 19 4*

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**SURFACE CONDENSERS**—Having built and used at our machine shop and foundry one of J. M. Miller's Surface Condensers for the last 14 months, we are now prepared to receive orders for building and putting up said condensers on either high or low pressure engines now in use, and warrant the same against expansion and contraction of the metals, also the injurious effects of oil in the tubes, which alone has caused the failure of condensers heretofore used. We have also found, in the use of our Condenser a nett saving of 30 per cent. of fuel, the water being kept pure and regular in the boiler by the condensation of the steam. In our judgment this Condenser is the perfecting of the Steam Engine. COBB, MASON & HILL,
North Point Foundry and Machine Works,
18 4 Jersey City, N. J.

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**W. P. N. FITZGERALD,** Counsellor at Law has recently resigned the office of principal Examiner of Patents, which he has held for many years, and is ready to assist, professionally, in the preparation and trial of patent causes before the U. S. Courts in any of the States, and before the Supreme Court of the United States. He also acts as Counsel in cases before the Patent Office, and on appeals therefrom, but does not prepare applications for Patents Office orner of E and 8th sts., Washington, D. C. 18 tf

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**PATENT DRAFT BOARDS**—With extension scales, sheet fasteners, and T rule. See Reports of Worcester Fair, Maryland State Fair, &c. &c, with their awards. $10 complete. Sent by express. Address, post-paid, CHAMBERLIN & CO., Pittsfield, Mass. 16tf

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**C. B. HUTCHINSON'S PATENT STAVE** Cutting Machines, the best in use, and applicable alike to thick or thin staves; also his Head Cutting and Turning, and Stave Jointing Machines.
For machines or territorial rights, apply to C B. HUTCHINSON & CO., Syracuse, N. Y. 9tf

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**IRON FOUNDERS MATERIALS**—viz.: Scotch and American Pig Iron, of favorite brands; Scotch patent Fire Bricks—square, arch, and circular. Fire Clay and Fire Sand; Moulding Sand for Iron and Brass Founders; Core Sand and Flour. Pulverized Black Lead, Soapstone, Sea Coal, Anthracite, and Charcoal Bolted Facings of approved quality, for sale by G. O ROBERTSON, & CO., office 135 Water street, (corner of Pine), N. Y. 19 6eow*

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**BEARDSLEE'S PATENT PLANING** Tonguening and Grooving Machines—These celebrated machines have now been generally introduced in various portions of the United States. More than thirty are now in successful practical operation in the State of New York alone. As an illustration of the extent of work which they are capable of performing, with unrivalled perfection, it is sufficient to state that, within the last six months and a half, over five millions of feet of spruce flooring have been planed, tongued and grooved by one of these machines at Plattsburgh, N. Y., never running to exceed ten hours a day. The claim that the Beardslee machine was an infringement upon the Woodworth patent, has been finally abandoned; and the proofs had been taken, the suit instituted by the owners of that patent was discontinued, and the whole controversy terminated on the first of November last. Applications for machines or rights may be made to the subscriber, GEO. W. BEARDSLEE, 57 State street, or No. 764 Broadway, Albany. 15tf

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**EXHIBITION OF WORKS OF AMERICAN** Industry at Washington City.—The first exhibition of the Metropolitan Mechanics' Institute will be opened on Thursday, the 24th of February, 1853, in the new and splendid hall of the east wing of the Patent Office, one of the largest and most magnificent rooms in the United States, being 275 feet long by 70 feet wide. To this exhibition the manufacturers, mechanics, artists, and inventors, from all portions of the Union, are cordially invited to contribute. The hall will be opened for the reception of goods on Monday, tha 14th of February, and the exhibition will positively close on or before Thursday night, March 17. Circulars, containing detailed instructions, will be forwarded and any further information given, on application (post-paid) to the Corresponding Secretary, Charles F. Stansbury, to whom all communications on the business of the Institute should be addressed. 8tf

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**WOODBURY'S PATENT PLANING Machines**—I have recently improved the manufacture of my Patent Planing Machines, making them strong and easy to operate, and am now ready to sell my 24 inch Surfacing Machines for $700, and 14 inch Surfacing Machines for $650 each. I will warrant, by a special contract, that ONE of my aforesaid machines will plane as many boards or plank as two of the Woodworth machines in the same time, and do it better and with less power. I also manufacture a superior Tonguing and Grooving Machine for $350, which can be either attached to the Planing Machine, or worked separately. JOSEPH P. WOODBURY, Patentee, Border st, East Boston, Mass. 13tf

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**MACHINERY.**—S. C. HILLS, No. 12 Platt-st. N. Y. dealer in Steam Engines, Boilers, Iron Planers, Lathes, Universal Chucks, Drills; Kase's, Von Schmidt's and other Pumps; Johnson's Shingle Machines; Woodworth's, Daniel's and Law's Planing machines; Dick's Presses, Punches and Shears; Morticing and Tennoning machines; Belting; machinery oil, Beal's patent Cob and Corn mills; Burr mill and Grindstones; Lead and Iron Pipe &c. Letters to be noticed must be post-paid. 13tf

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**A. B. ELY,** Counsellor at Law, 52 Washington st., Boston, will give particular attention to Patent Cases. Refers to Munn & Co., Scientific American. 16tf

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**LEONARD'S MACHINERY DEPOT, 109** Pearl-st. and 60 Beaver, N. Y.—Leather Banding Manufactory, N. Y.—Machinists's Tools, a large assortment from the "Lowell Machine Shop," and other celebrated makers. Also a general supply of mechanics' and manufacturers' articles, and a superior quality of oak-tanned Leather Belting.
7tf P. A. LEONARD.

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**PAINTS, &c. &c.**—American Atomic Drier Graining Colors, Anti-friction Paste, Gold Size, Zinc Drier, and Stove Polish.
QUARTERMAN & SON, 114 John st.,
1tf Painters and Chemists.

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**LATHES FOR BROOM HANDLES, Etc.**—We continue to sell Alcott's Concentric Lathe, which is adapted to turning Windsor Chair Legs, Pillars, Rods and Rounds; Hoe Handles, Fork Handles and Broom Handles.
This Lathe is capable of turning under two inches diameter, with only the trouble of changing the dies and pattern to the size required. It will turn smooth over swells or depressions of 3-4 to the inch and work as smoothly as on a straight line—and does excellent work. Sold without frames for the low price of $25—boxed and shipped with directions for setting up. Address (post paid) MUNN & CO.
At this Office.

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**FALES & GRAY** (Successors to TRACY & FALES), RAILROAD CAR MANUFACTURERS—Grove Works, Hartford, Connecticut. Passenger, freight, and all other descriptions of railroad cars and locomotive tenders made to order promptly. 1tf

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**THE TROY IRON BRIDGE CO.** are prepared to erect Iron Bridges or Roofs, or any kind of bearing trusses, girders, or beams, to span one thousand feet or under, of any required strength, in any part of the country. Their bridges will be subjected to severe tests, and can be built for about the price of good wooden ones. Address BLANCHARD & FELLOWS, Troy, N. Y. 7 20*

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**J. D. WHITE'S PATENT CAR** AXLE LATHES —also Patent Engine Screw Lathes, for boring and turning tapers, cutting screws, &c. We manufacture and keep constantly on hand the above lathes; also double slide Chuck and common Hand Lathes, Iron Planers, S. Ingersol's Patent Universal Ratchet Drill, &c. Weight of Axle Lathe, 5,500 lbs; price $600; Engine Screw Lathe, 1400 to 7,000 lbs; price $225 to $675, BROWN & WHITE,
15tf Windsor Locks, Conn.

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**NEW HAVEN MANUFACTURING COM-** pany, Tool Builders, New Haven, Conn., (successors to Scranton & Parshley) have now on hand $25,000 worth of Machinist's Tools, consisting of power planers, to plane from 5 to 12 feet; slide lathes from 6 to 18 feet long; 3 size hand lathes, with or without shears; counter shafts, to fit all sizes and kinds of universal chuck gear cutting engines; drill presses, index plates, bolt cutters, and 3 size slide rests. The Co are also manufacturing steam engines: All of the above tools are of the best quality, and are for sale at 25 per cent. less than any other tools in the market. Cuts and list of prices can be had by addressing as above, post-paid. Warehouse No. 12 Platt st., New York, S. C. HILLS, Agent N. H. Man'g Co. 19tf

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# SCIENTIFIC MUSEUM.

### On the Causes of Rain and the Possibility of Modifying them by Art.

We have received a circular bearing the above title from Daniel Vaughan. His theory is as follows :—

That electricity partakes of the power of sustaining vapor in the atmosphere is evident from several facts. When allowed to evaporate, the surface of water is not only cooled, but is also rendered negatively electrified, while the vapor itself is positive. From this it appears that the vapor is formed at the joint expense of heat and electricity. Experiments also prove that evaporation is retarded whenever the water is insulated; a result which shows more conclusively the part which the electric fluid acts in the production of vapor. Accordingly the amount of watery vapor which the atmosphere can contain, depends not only on its temperature, but likewise on its electricity, which, according to all experiments, is much increased in intensity at great elevations, and here its agency becomes important as that of heat declines.—The evaporation of water and the friction of the air against the surface of the earth, are commonly regarded as the principal sources of atmospheric electricity; and, to render the mechanism of nature more effective for its development and for confining it to the upper regions, an insulator is provided by means of the lower stratum of air which is most free from humidity, for the moist air continually ascends on account of its inferior specific gravity.

It is well known that positive electricity is always liberated whenever vapor is condensed; and, should its escape be prevented by insulation, the condensation will, of course, be retarded. The non-conducting power of the lower stratum of air will, therefore, be the means of keeping the aqueous vapor dissolved in the atmosphere until the insulation is broken by the near approach of humidity to the earth's surface or by other causes.—The electricity being then no longer confined by a proper barrier, should escape to the earth: the portion of vapor which was dependent on its support, should condense, and in most cases, descend as rain; while, at the same time, the drops in approaching the surface of the earth, should saturate the earth with moisture, and thus furnish a means for the more rapid discharge of electricity and the more complete precipitation of the superfluous water of the atmosphere.

In consequence of the humidity of the atmosphere, mountains withdraw electricity from a considerable distance; and by causing the descent of rain open numerous channels by which the electric fluid passes from much greater distances to the adjacent lowlands.—The indirect influence of mountains, therefore, extends many miles around them, and hence it is that they do not themselves receive as much rain as the plains and valleys in their vicinity though their effect on its production is too obvious to be doubted. In the vast island or continent of Australia which contains no mountains, years sometimes elapse without a shower; a cloud on the sky is regarded as a phenomenon; the rivers are all too insignificant for navigation, and most of them are quite dry during eight months of the year. A single river of the mountainous region of South America, contributes more water to the ocean than all the rivers of the continent of Africa, which is much more extensive. Even the principal African rivers rise in the highlands under the equator, they receive scarce any accession of water from the lower districts.

The part which trees take in the removal of electricity from the upper regions, is far greater than might be suspected from their moderate elevation. They increase the quantity of rain and cause it to fall in gentle and seasonable showers, instead of coming in rare and violent torrents. That the destruction of forests is attended with a diminution of rain, is a fact proved beyond doubt from observations made on this continent; and, according to Humboldt and Boussingalt, the same result is visible in South America.

From the result of the experiments of nature, it is evident that by discharging the electricity in the upper part of our atmosphere, we may deprive rain of its injurious effects, and not only render it more beneficial to our wants and to the purposes of agriculture, but even extend those benefits to the sandy deserts and redeem them from their present sterility. The construction of lightning rods on a scale sufficiently large for this purpose, would be attended with the greatest difficulties. A momentary communication with the imprisoned electricity is all that is desirable. A temporary communication may be most readily formed by projecting a considerable body of water into the atmosphere by the means of the expansive force of condensed air, or of carbonic acid subjected to a pressure. The following plan, says Mr. Vaughan, for this purpose seems best calculated to allow the elastic forces sufficient time for action, and to obviate the difficulty of permitting the water to escape at once from an enormous pressure through a large orifice with a sufficient velocity.

Let a large tube of the form of the letter U, or of a semi-circle, be constructed, and let it be placed with both ends upright and one of them permanently closed. The other end is to be stopped air-tight by means of a large valve, which presses against its mouth, and turns on an axle when opening, while it is secured on the other side by a lever, so arranged that, on the fall of a weight on its remote extremity, it loses its hold on the valve and allows it to open. At a short distance below this valve, let the tube communicate with a strong vessel, in which carbonic acid is prepared by the action of sulphuric or muriatic acid on carbonate of lime, or with a condenser, if air be employed. Having introduced water in the tube, in a quantity sufficient to fill one-sixth of its capacity, the valve must be closed, and the apparatus arranged for the introduction of the air or carbonic acid into the confined space. The gaseous mixture after forcing the water in the closed end of the tube above its former level, will rise through it in bubbles, filling the space over it and attaining nearly the same density as in the other end. When the pressure becomes as great as the strength of the tube will permit, the valve being allowed to open, one part of the confined air or gas escapes and clears the orifice for the exit of the water, which is driven into the air by the expansion of the other part of gaseous mixture in the remote extremity of the tube.

From a cast-iron tube 200 feet long, 20 inches in diameter, and 2 inches thick, a cylindrical column of water thirty feet long may be in this manner launched into the air, with a velocity of over 700 feet a second, and, if not prevented by the air, it should reach an elevation of nearly 8,000 feet.

The effect of such a discharge, like the influence of a mountain, must extend to a distance of several leagues; and it would not be rash to expect that in this manner, the irregularities in the supplies of rain throughout the habitable globe, may be corrected with much less labor and expense than was bestowed on one of the artificial mountains of Egypt.

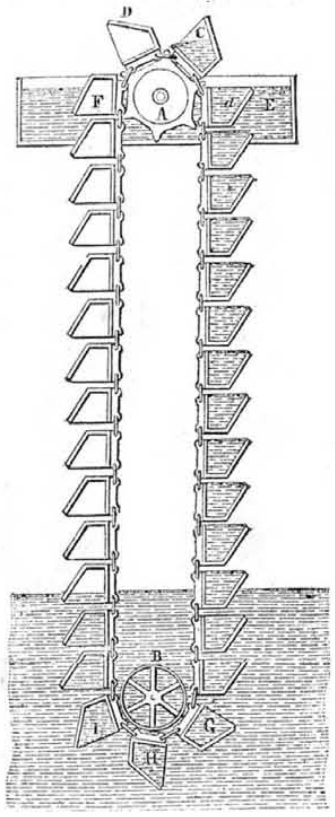
### Blowing up a Huge Chimney.

The enormous chimney of Messrs. Muspratt's chemical works, which is 406 feet high, 46 feet in diameter at the base, and 17 feet in diameter at the summit, was levelled to the ground in an instant by means of gunpowder. It is necessary to explain to our readers that the above works are situated about twenty miles from Liverpool, England, in the vicinity of the London and Northwestern Railway, at what is called the Warrington Junction, and some idea of the size of the chimney may be conceived, when informed that it contained 3,500,000 bricks, weight 3,500 tons. The following was the mode of operating: a number of holes were dug round the base, and 14 charges of gunpowder inserted, nine of these exploded without any apparent damage being done to the stability of the shaft, but the report of the tenth had no sooner been heard than the huge chimney was rent from top to bottom, and the enormous fabric fell, crumbling along gradually from the base upwards. The whole column fell nearly within the circumference of its own base. A dense cloud of lime-dust hid the ruins for a few seconds, but when it cleared off the debris were perceived in the shape of a large mound. No accident of any kind occurred, although a considerable number of spectators had assembled to witness the downfall of this vast chimney.

### Wells, Pumps, &c.

[Continued from page 158.]

The annexed engraving is a side elevation of a series of buckets for dipping and carrying up water from a stream. They are placed upon an endless chain, and run over pulleys as represented. The upper pulley, A, has cogs on its periphery to take into the links of the chain. This is the pulley, which is moved by a handle secured on the axle. The lower pulley, B, is only a guide for the buckets, I H G, passing around it. The buckets dip up the water, carry it up to the upper pulley, and discharge in a horizontal line with the top of the working pulley, where it flows into and out of a box, F, as fast as it it is discharged. The




bucket, *a*, is full, the next one, C, has been partially discharged, and the one, D, has emptied itself. The next one, F, is passing down empty, and thus one set of buckets are continually going down empty, while the other set are returning full. This system of lifting water is very old, and in oriental countries the cups were made of leather, with small perforations in the bottom, which allowed the air to escape when they were entering into the water below, so as to make them work easy, this, however, involved a small loss of water, which was of no great consequence in comparison with the gain of allowing the air to escape. This is a very poor system for lifting water, and is not to be compared to the chain pump.

This system of an endless chain of buckets has been employed as a hydraulic motor, by allowing the buckets to operate in the contrary direction. The water from a high fall is conducted by a spout to fall into the top descending bucket, which descends as it is filled and the whole descending series are filled with water. If each bucket contained a cubic foot, and there were 33 buckets, no less than 16 cubic feet, or 1000 lbs., of water would be descending continually. In order to give more direct power to the main shaft which would be the axis of the top roller, it has been proposed to us a number of times to employ such a hydraulic apparatus as a substitute for the water wheel. Those who made such suggestions were not aware that this was an old apparatus. The friction of the buckets passing over the rollers is very great, and the parts cannot be made of such strength as is required for a powerful motor; it is not a suitable substitute for the water wheel; this information may save some toil and study to those men who have not been in possession of the facts mentioned.

CHARLESTON ARTESIAN.—In Charleston, S. C., at various times, for more than two years, we believe, repeated efforts have been made to obtain water by boring. The bore is now 930 feet deep. It was expected that water would have been obtained long before this, and considerable disappointment has been felt from time to time. Prof. Tuomey, believed that they would have obtained water at a higher level, but he encouraged them to go on in hope, and on they have gone with courage and perseverance. By the "Charleston Mercury," we learn that Mr. Welton, who superintends the boring, has recently obtained improved screw tubing from this city, and is now diligently at work with great hopes of soon reaching a good supply of water.

There seems to be strange opposition to railroads in cities; why this feeling should exist we cannot divine.

### LITERARY NOTICES.

MACAULAY'S SPEECHES—2 vols. 12mo.; Redfield, Nassau street, N. Y. Price $2. in cloth.—We are indebted to that enterprising publisher, S. P. Redfield, for this new edition of the speeches of the Rt Hon. T. B. Macaulay, the historian, essayist, and statesman. The Hon. gentleman's fame is world-wide, so that any eulogium that we might bestow upon these specimens of his oratorical abilities, would be universally considered as superfluous We would, therefore, merely direct attention to what is stated in the preface, that "The following speeches, which are now for the first time brought together, are reprinted in a connected and complete series from the standard authority, Hansard's Parliamentary Debates. They embrace the whole of the distinguished orator's course in the House of Commons from 1830 to the present day." The work is very neatly got up, and ought to be extensively circulated, for no one that has read Macaulay's History of England, can fail to feel an inclination for a further acquaintance with the author.

POST OFFICE DIRECTORY—Price 50 cents; C. R. Rode, 161 Broadway. This is a book that every business man ought to have in his office as a companion to the City Directory, and to those who have much correspondence it is even more necessary. The different post-offices are arranged in alphabetical order, with the names of the County and State in which each is located, as well as that of the Postmaster. Some curious statistics may be gleaned from this apparently dry work with its formidable array of names in double columns, for example, we have recorded in it 25 places named Washington, and others where Washington forms part of the name, 22 Franklins, 19 Buena Vistas, &c. &c., evidences that it contains an ample list of Post Offices, and its correctness is certified by Chauncey Smith, of the Post Office Department, at Washington. Useful tables of postage for the United States, Canada, and other foreign countries, &c., are prefixed.

LITTELL'S LIVING AGE—No. 455 of this able weekly Magazine contains 10 excellent articles, the first, named the "Cotton Metropolis, or city of Manchester, England, is one of the most able and instructive articles we have ever read. It will rub the mist off the eyes of many men who have an idea that manufacturing operations are necessarily degrading. Littell & Son, Boston, publishers.

SERIAL PUBLICATIONS FOR FEBRUARY.—Graham's Magazine contains several fine illustrations and excellent original matter; Dewitt & Davenport agents.

Meyer's Universum contains four fine steel engravings, with descriptive articles of rare merit. The present number, 12, closes the first volume: H. J. Meyer, New York, publisher.

"New England Cultivator," edited by George P. Burnam, Esq., is a neat, agreeable, and, withal, a very useful agricultural journal The editor is a gentleman of taste, discrimination, and ability, and well understands what he writes about. Boston, Mass. Terms $2.

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